

JANUARY 1955 26

Business

THE JOURNAL OF MANAGEMENT IN INDUSTRY

How Industry
Can
'Communicate'

Special BUSINESS

Brains Trust

Page 73



FOR NEW IDEAS *

ON BUSINESS CREDIT

Every modern accounting department needs an efficient ledger posting system. Each customer's account must be instantly available, in a form that an executive can understand and act upon immediately. If you want to eliminate every trace of guesswork from your credit arrangements, send for the Man from Remington Rand. He'll explain, free and without obligation, how easy it is to base credit decisions on accurate, up-to-date facts.



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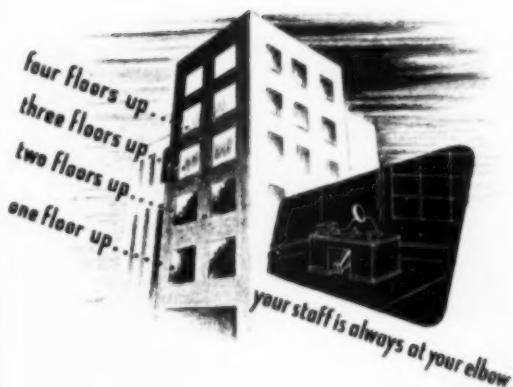
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JANUARY, 1955

Business

FEDERAL OF MANAGEMENT IN INDUSTRY

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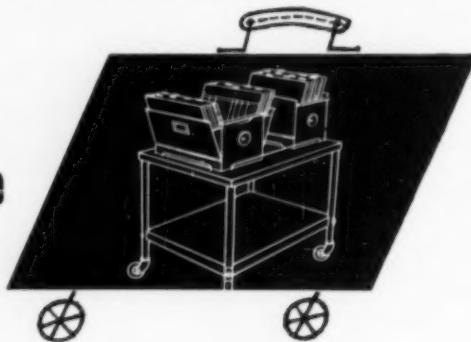
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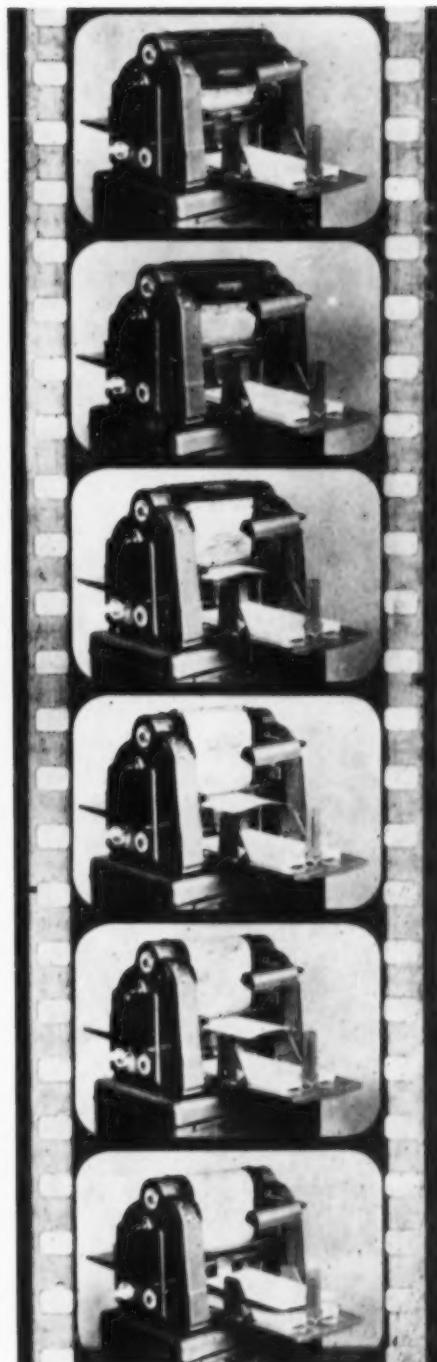
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storage



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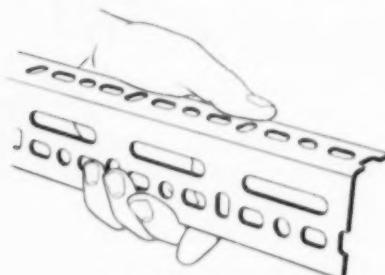


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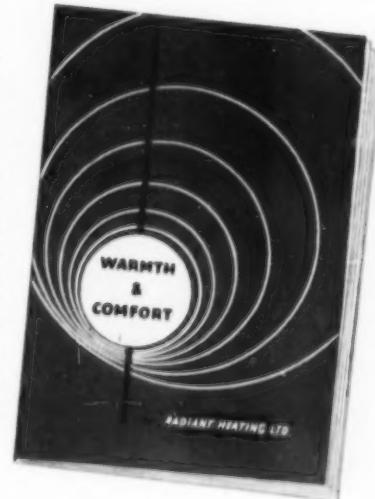


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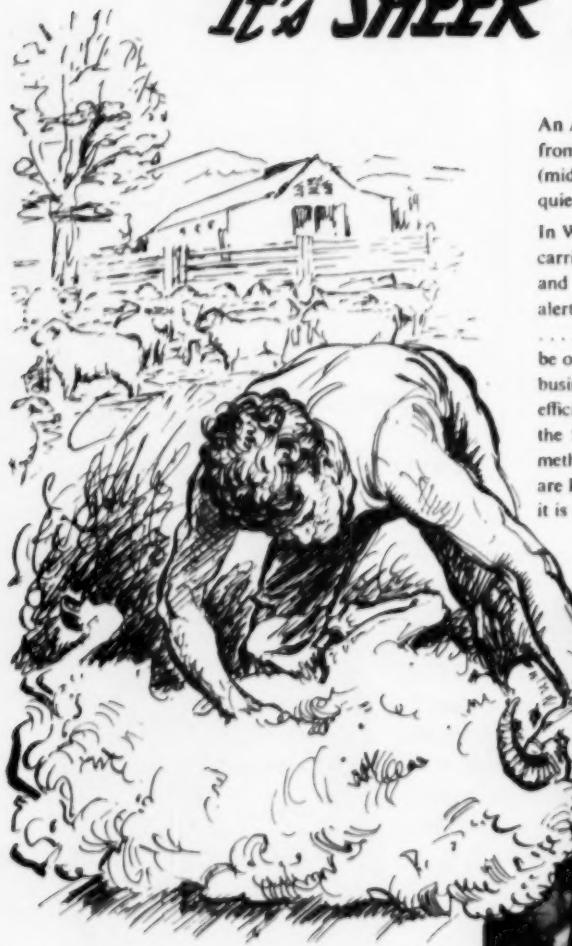
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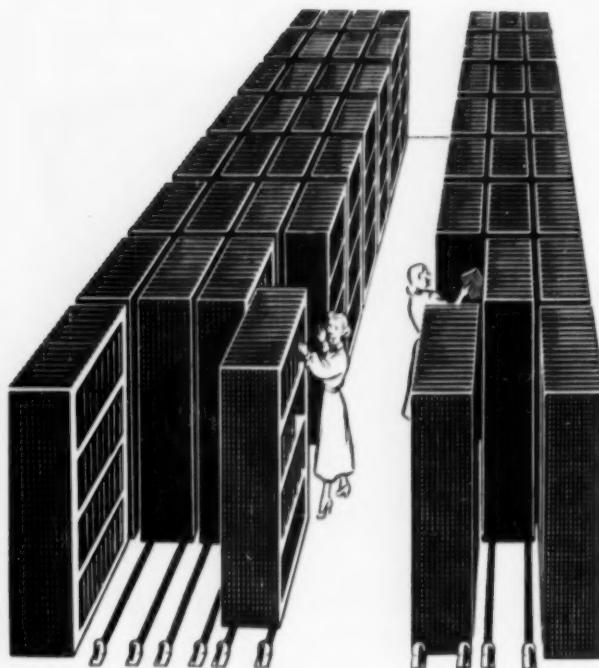
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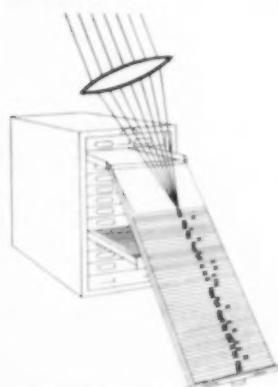
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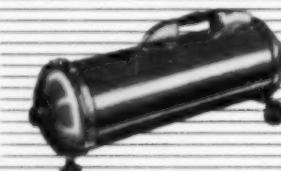
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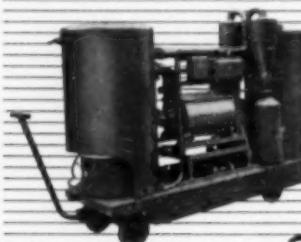
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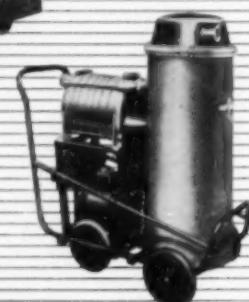
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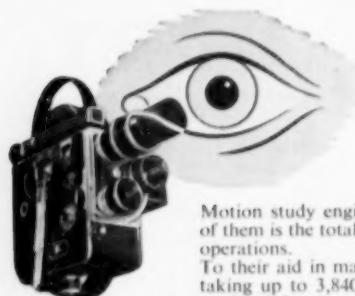
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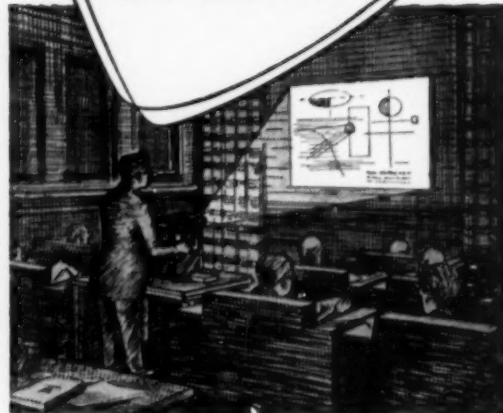
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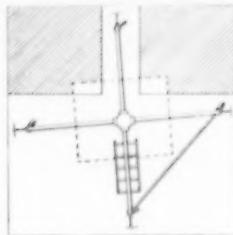


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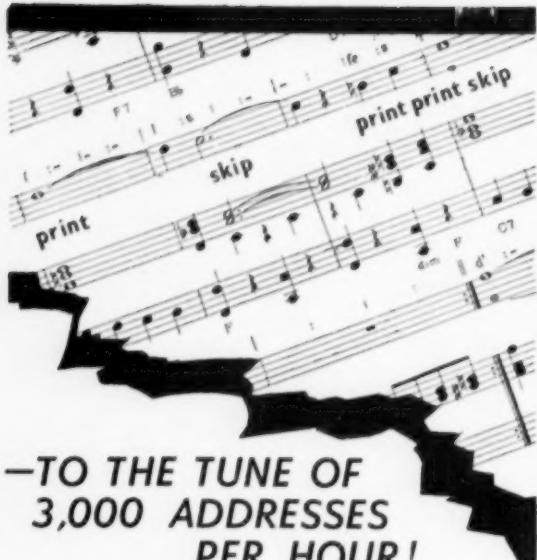
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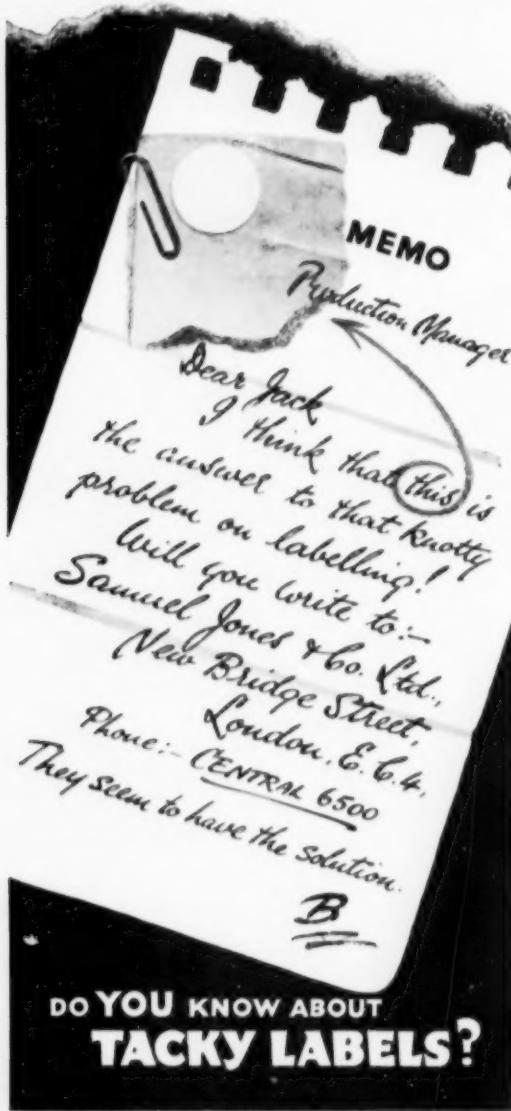
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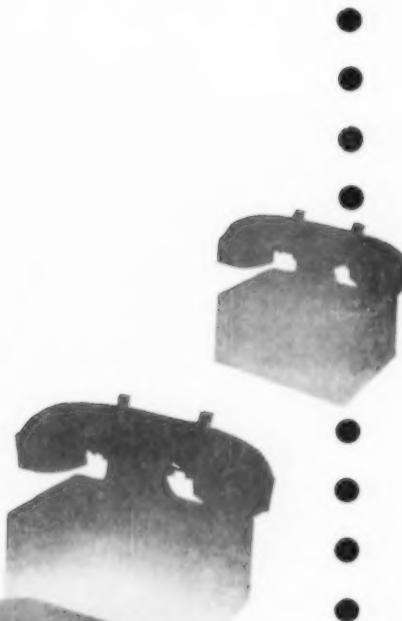
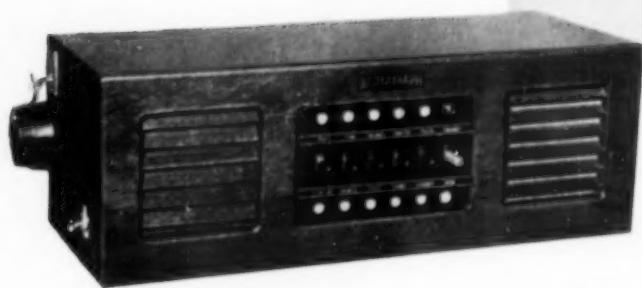
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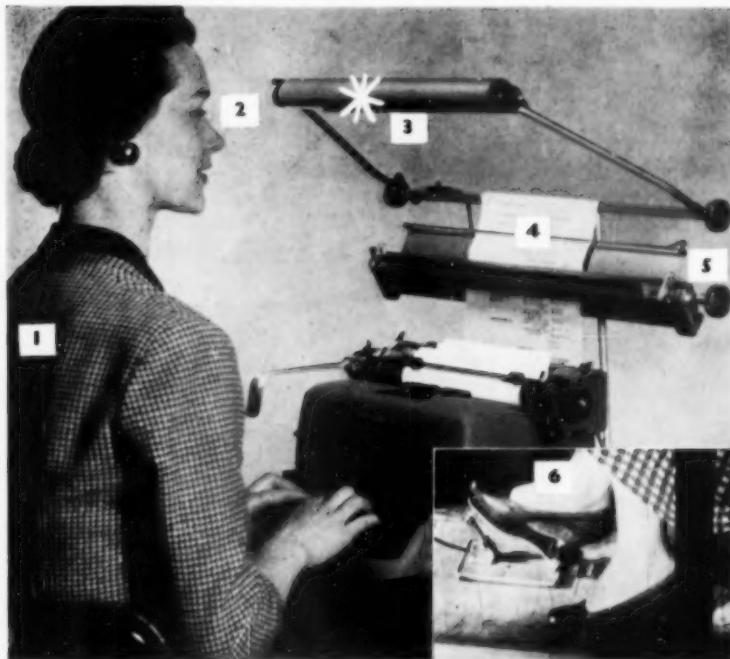
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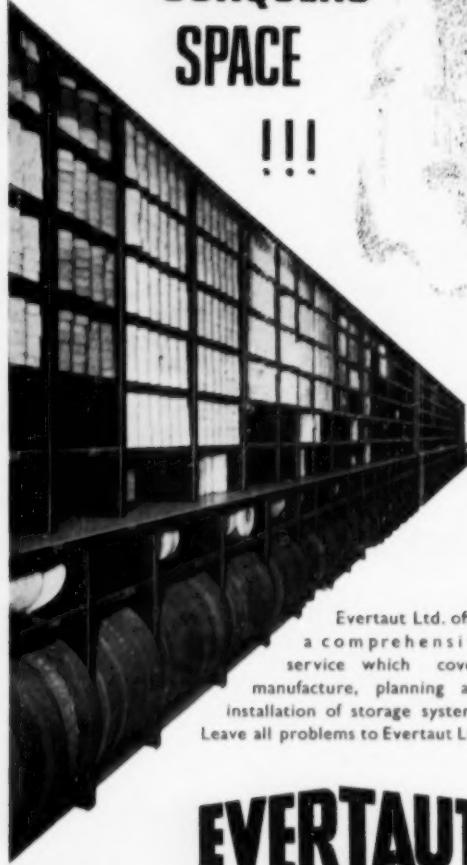


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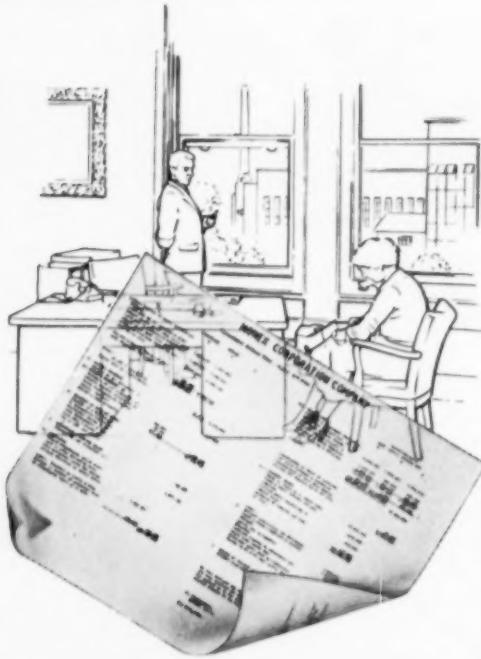


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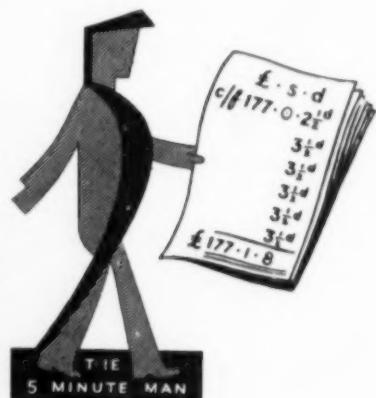
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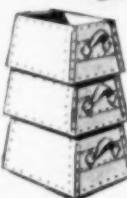
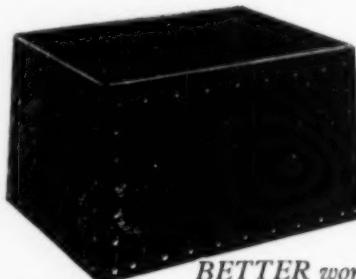
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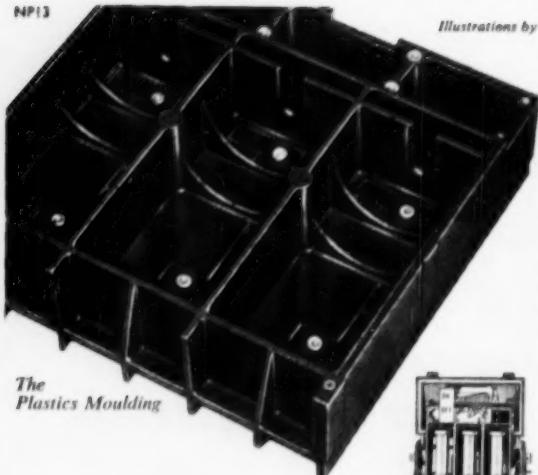


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The Fuse Carrier with tripping mechanism and fuses



The complete Switch with Fuse Carrier raised for inspection

where plastics really matter

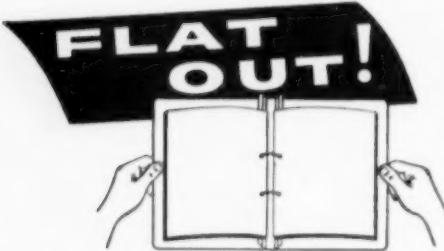
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PROSPECT

survey and forecast of business conditions

THE MONTH'S HIGHLIGHTS AND TRENDS

Outlook for 1955—Reassuring

London, December 21, 1954

- In assessing the business outlook for 1955, we must first of all comment on something which has become increasingly noticeable in recent years—the insensitivity of the economy to shocks. This is important, for if the economy has become less sensitive to shocks, we can place more reliance on forecasts of total spending in the country during 1955, and pay less attention to the possibility of unexpected reverses of fortune.
- During the November dock strike, an evening newspaper City column ran a headline, "Even the £ shrugs off the Dock Strike." The value of the £ sterling on foreign exchange markets depends very much on the state of British overseas trade, and much of this trade was held up by the strike. And yet the £ did not fall in value. Here was a typical case of insensitivity to sudden misfortune.
- Before the war, the Stock Exchange would react daily and quite violently to news of a revolution in South America, a fall of government in France, a warlike speech by Mussolini or even a minor change of ministers in Britain. But today the news of strife in some quarter of the globe, or of a natural disaster like an earthquake, is likely to be regarded as an opportunity for new sales and investment. It may move markets up rather than down. Perhaps we have become so accustomed to major horrors like the Belsen concentration camp and the explosion of hydrogen bombs that minor troubles go almost unnoticed.
- There is, however, another cause of insensitivity. This is what the Americans call the "built-in stabilizers" of the economy, which help to ward off recession in a way that was unknown before the war. Why did share prices on Wall Street maintain an upward trend during the recent American recession if it were not for businessmen's faith in the "built-in stabilizers"? But they apply to Britain even more than to the United States.
- The first of these stabilizers, or one might call it an "inflator," was pointed out in 1945 by Mr. Colin Clark, the celebrated economist. He studied the budgets of a number of countries and reached the conclusion that when the State spends more than 25 per cent of the national income, there is a continuous tendency towards inflation. He based his reasoning on the fact that certain sections of the community were paying most of the taxes while certain other sections were receiving most of the benefits of public expenditure. When this exceeded 25 per cent of the national income, the balance of political and economic power was on the side of more spending and inflation.
- Although public expenditure has declined somewhat in Britain since the war, central and local government expenditure together still make up 37 per cent of the national income, if one includes the national insurance scheme, or 33½ per cent excluding this scheme.
- Another "built-in stabilizer" is the effect of new inventions and techniques on public expenditure. For example, more and better motor-cars create a demand for expenditure on highways, parking facilities and traffic control, and new developments in medical science cause an increase in the cost of the health service even when

continued on following page

THE MONTH'S HIGHLIGHTS AND TRENDS (continued)

there is no change in the general conditions of treatment under the service. The doctors naturally demand the latest equipment to conquer previously unconquerable diseases—one reason why the health service now costs twice the original estimate.

- Another stabilizer is the power of the trade union movement, which watches profit figures and the cost of living very closely, and is able to bargain repeatedly and successfully for wage increases. Moreover, these increases go to people who are unlikely to save much, if any, of their higher wages. Hence expenditure rises in proportion. By contrast, if the money had remained as profits and dividends in the hands of business firms and investors, some of it may have been saved.
- A further economic stabilizer results from the competitive position of some of the large-circulation daily newspapers. Even disregarding party politics, these newspapers seek higher circulations by the successive championing of various causes—whether on behalf of the very young, the very old or some other section of the community. This has an "egging-on" effect on public expenditure.
- During the first nine months of 1954, there was a rise of 80 per cent in the number of factory building schemes approved by the Board of Trade. This does not, however, mean that there will be a very large increase in industrial investment during 1955. The constructional industries will, it is estimated, increase their output by only about 5 per cent during 1955. The reason is the long delay between receiving Board of Trade planning permission to site a factory in a particular area and the completion of the building. Even the foundations of most of the factories approved in 1954 are unlikely to be laid before the end of 1955.
- Nevertheless, many of the new factory-building schemes were no doubt influenced by the Chancellor's investment allowance in the last Budget. And the fact that so many firms which were undecided have now taken the plunge will probably influence others to do likewise, for fear of being left behind by their competitors. The investment allowance should therefore have a snowballing effect over the next few years, provided the state of business holds up generally. And as we have seen from our discussion of built-in stabilizers, this seems likely.
- During the first 10 months of 1954, industrial output in the United Kingdom was 5-6 per cent higher than a year earlier. This was rather similar to the rise in France, Belgium and the Netherlands, but well below the 11 per cent increase in Western Germany. The snowball effect mentioned above could result in some of the gap between Germany's and Britain's rates of expansion being closed. But the complete closing will not be easy, for the British market is a more developed, balanced market. The process of post-war reconstruction in Britain has gone farther.
- The quarterly survey carried out by the United States Department of Commerce and the Securities and Exchange Commission reveals that in the first quarter of 1955 American businessmen plan to spend slightly less on capital goods investment than in the same period of 1954. Although it is reassuring to know that there will be no extensive drop, the fact that there has been even a slight drop suggests that the United States economy will not show any rapid rate of recovery.
- Nevertheless, as this country weathered the worst of the American recession so well, there are no grounds for concern, provided we do not have serious inflation here. Moreover, in his January messages to Congress, President Eisenhower is likely to announce further economic aid for Asian countries, and this will indirectly help to improve sterling in relation to the dollar.
- As 1955 will probably be an election year for the United Kingdom, the Government will no doubt introduce as attractive a Budget as possible, thereby giving some further stimulus to spending. If the balance of payments should become less favourable, the most likely action will be a rise in the Bank Rate. But this would probably be only a small rise, and it should not deter businessmen from proceeding with long-term plans.

SALIENT FIGURES OF THE MONTH

Production index for September (8) was 130, or 18 points above the August (holiday) level, and 5 points above the level a year earlier. Provisional figure for October is 134.5, which is a moderate advance on the figure of 131 for October last year.

Value of exports (22) in November was £201.9 million, or £22.1 million below the October figure—mainly due to the dock strike. Exports in November were also £46.9 million below the level a year earlier. Imports responded quickly after the strike and were valued at £333.8 million in November, or £105.6 million above October and £61.4 million above November last year.

Registered unemployed in November (7) rose by 9,000 in November to 263,000, but the figure was still 59,000 below the level a year earlier. Total employment in manufacturing industry rose by a further 54,000 to 9,192,000, this level being 264,000 more than in November, 1953. Numbers employed in the distributive trades rose by 21,000 in November to 2,746,000, or 48,000 more than a year earlier.

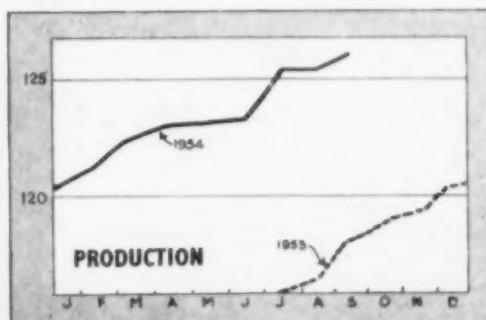
Retail sales index in October (25) was 131, or 2 points above September and 6 points above October, 1953.

Weekly wage index in October (31) was 143, the same as in September and 6 points higher than a year earlier. Retail price index rose 1 point in October to 144, which is 4 points higher than a year earlier.

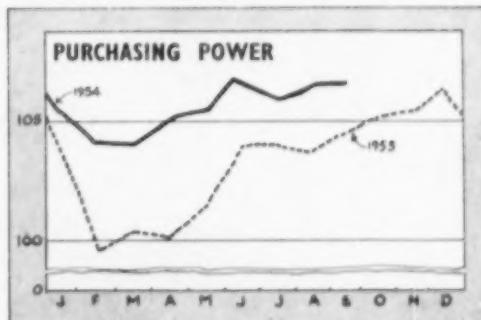
		Latest Month	Increase (+) or Decrease (-) on a		
			Month Ago	Year Ago	
'BUSINESS' INDICES					
1. Production (12-month moving average)	1948=100	* 126.1	+ 0.4	+ 7.9	
2. Purchasing Power	... (do.)	* 107.2	Same	+ 2.8	
MANPOWER					
3. Total manufacturing industries	(thousands)	9,192	+ 54	+ 264	
4. Textiles	... (do.)	1,001	+ 2	+ 6	
5. Distributive trades	... (do.)	2,746	+ 21	+ 48	
6. Coal (on colliery books)	... (do.)	704	— 1	— 2	
7. Registered unemployed (G.B.)	... (do.)	† 263	+ 9	— 59	
PRODUCTION					
8. Index of prodn.: total, all inds.	1948=100	* 130	+ 18	+ 5	
9. Coal (average weekly output)	(thousand tons)	4,602	+ 282	+ 5	
10. Gas available at gasworks (average weekly output)	(million therms)	51.7	+ 3.7	— 0.9	
11. Electricity generated	(million kWh)	6,241	+ 624	+ 413	
12. Steel ingots and castings (average weekly output)	(thousand tons)	375	+ 3	+ 20	
13. Cotton yarn	... (million lb.)	17.50	+ 0.68	+ 0.55	
14. Rayon yarn and staple fibre	... (do.)	38.88	+ 0.94	+ 0.43	
15. Worsted yarn	... (do.)	* 20.31	+ 6.05	+ 0.04	
16. Sulphuric acid	... (thousand tons)	* 165.5	+ 2.6	+ 13.2	
17. Passenger cars (average weekly, thousands)		16.2	+ 1.7	+ 2.9	
18. Commercial vehicles	... (do.)	5.9	+ 0.3	+ 0.5	
19. Permanent houses completed	(thousands)	31.93	0.76	+ 1.16	
TRADE					
20. Value of imports	... (£m)	† 333.8	+ 105.6	+ 61.4	
21. Value of imports, Dollar Area	... (£m)	* 56.7	+ 6.4	+ 0.7	
22. Value of exports	... (£m)	† 201.9	— 22.1	— 46.9	
23. Value of exports, Dollar Area	... (£m)	* 27.3	+ 3.0	— 2.7	
24. Freight train traffic	(thousand tons)	‡ 5.65	0.37	— 0.07	
25. Retail sale index	1947=100	131	+ 2	+ 6	
FINANCE					
26. Currency in circulation	... (£m)	1,569	— 1	+ 94	
27. Deposits, London clearing banks	... (do.)	6,609	+ 70	+ 236	
28. Provincial cheque clearings	... (£m)	750	+ 70	+ 54	
29. National savings, total outstanding	... (£m)	* 6,019	+ 13	+ 44	
30. Gold and dollar reserves	... (do.)	† 1,044	— 4	+ 129	
WAGES AND PRICES					
31. Weekly wage rates	1947=100	143	Same	+ 6	
32. Retail prices	... (do.)	† 145	+ 1	+ 4	
33. Price indices of materials used in:					
Non-food mfg. industry	1949=100	† 143.9	— 0.7	+ 1.5	
Mechanical engineering	... (do.)	† 154.4	Same	+ 7.1	
Electrical machinery	... (do.)	† 166.9	— 0.6	+ 9.9	
Building and civil engineering	... (do.)	† 133.0	+ 0.2	+ 2.9	
34. Import prices	1952=100	99	Same	Same	
35. Export prices	... (do.)	99	Same	— 1	

*September †November ;Four weeks to October 10th, 1954. All other figures refer to October.

'BUSINESS' INDICES (1948 = 100)

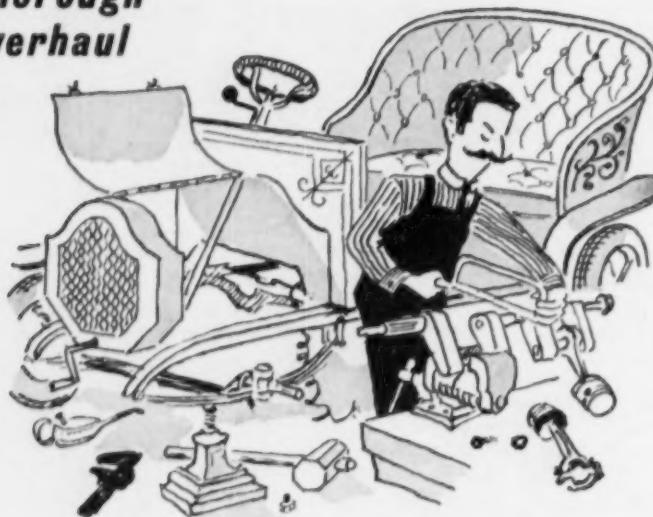


A twelve-month moving average of the Official Index of Industrial Production (Total: All Industries).



An unweighted index of currency in circulation with the public, total bank deposits, and total outstanding national savings.

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Building projects in London continue to make news. A £2 million extension to Broadcasting House in Portland Place is to be started this year and is scheduled for completion in 1957.

The City propose to extend their plan of building 340 flats in Golden Lane by adding another 240 flats and purchasing land on which to build them by compulsory order. The first part of the plan will cost £1.3 million and the proposed extension £627,000.

The L.C.C.'s town planning committee have recommended the purchase of 180 acres south of Woolwich Arsenal which have been offered by the Ministry of Supply for industrial development. Cost of acquisition, clearance and partial development will be some £1.5 million. This will enable the L.C.C. to transfer industries from sites needed for their redevelopment schemes elsewhere in the county, and industries now unsuitably sited in residential areas.

When completed, the £800,000 new building of the Chancery Lane Safe Deposit Co. will be the largest safe deposit premises in the world with 250 large vaults and 5,000 deposit boxes.

At the new Ocean Works of Submarine Cables Ltd. at Erith, production has commenced of the first transatlantic telephone cable. Two are to be laid, each providing 36 circuits; the first will be laid this summer and the second in 1956. The works have plant capable of producing 4,000 miles of cable annually.

Glaxo Laboratories Ltd., Greenford,

Middlesex, who are mainly engaged in the pharmaceutical industry, are making further extensions to their manufacturing capacity estimated to cost £600,000. They are also expanding their bacteriological research work and seeking applications of their products in fields other than those of human medicine.

An example of how improved methods of production have offset the rise in wages and materials was provided at the recent annual meeting of Morphy-Richards Ltd., St. Mary Cray, Kent. Said the chairman, Mr. George Wansbrough: "Retail prices today of those products we manufactured before the war are 225 per cent of the pre-war price. Average wage rates for men and women in our industry have increased in the same period to 274 per cent of the 1939 level, so that today a worker can buy the product with 18 per cent fewer hours of work. But materials used in the electrical industry now cost 379 per cent of their pre-war prices. If our selling prices had risen in proportion to an average of the increase in labour and material costs, the price of our product would be some 145 per cent of the present-day retail price.

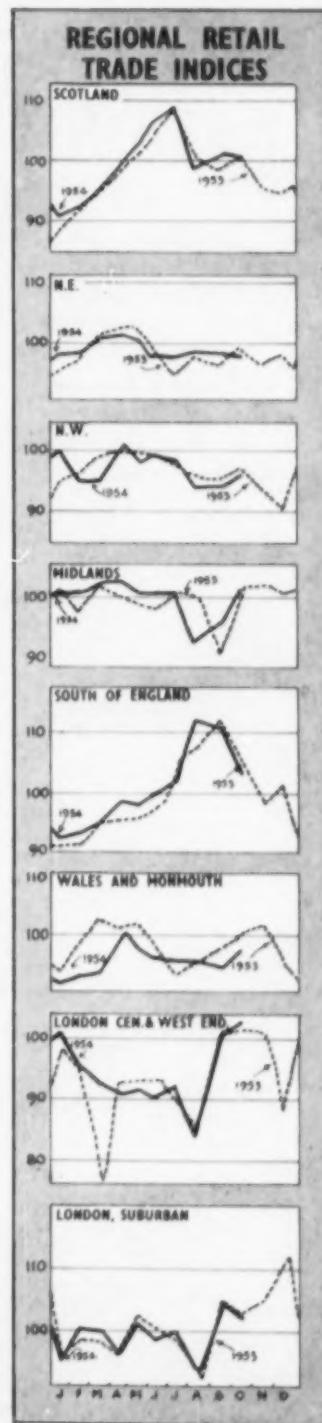
"Thus, by dint of the efforts of our suppliers and ourselves and by increasing volume of production, we seem to be giving nearly 45 per cent better value than before the war." The company are expanding their existing factory by 125,000 sq. ft. and production in the new premises should begin next year.

English Electric Export and Trading Co. have been awarded a \$1 million contract for two turbines for the dam project at Table Rock on the White

Continued on page 57

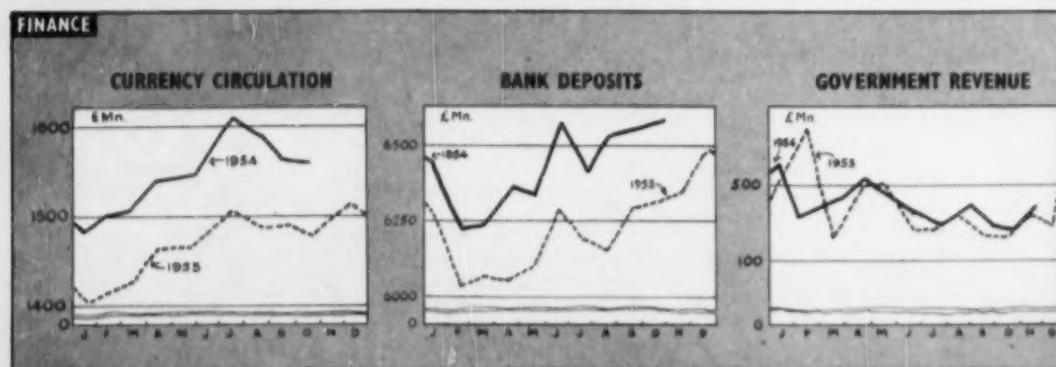
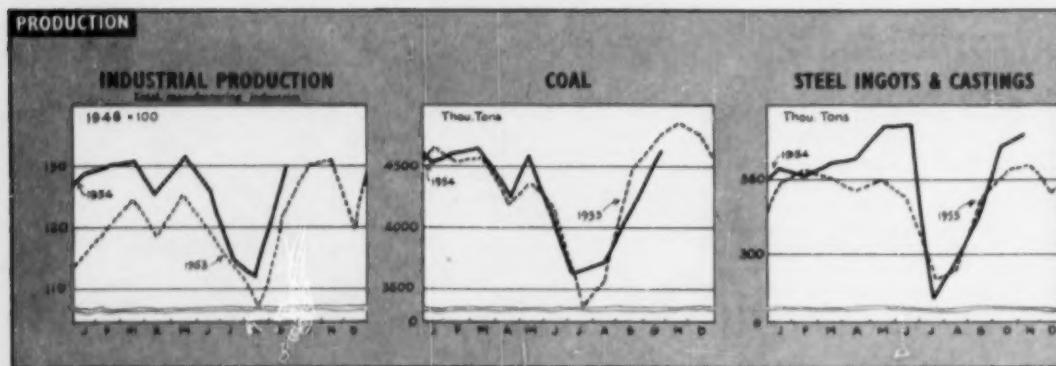
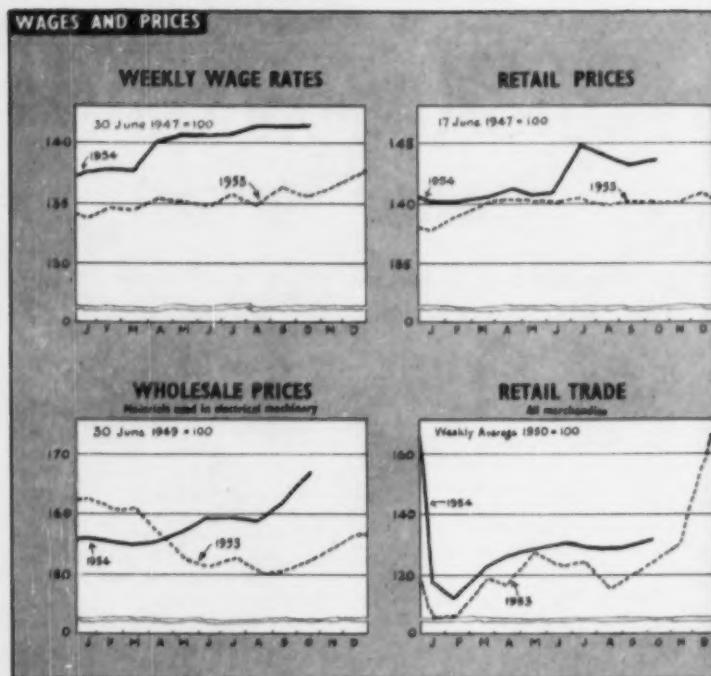
What the Charts Show ➤

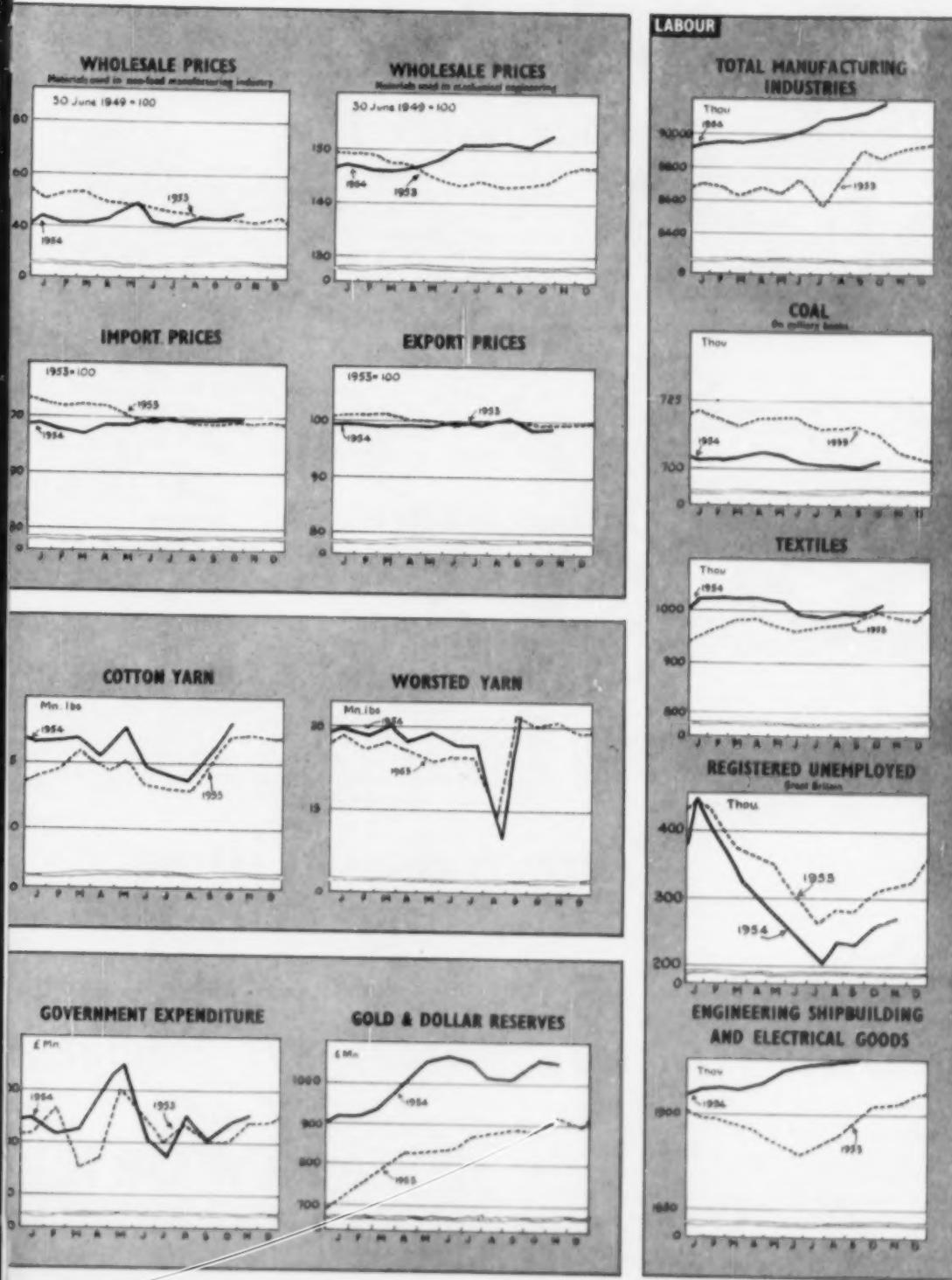
Indices in the charts show retail turnover in each region in non-food merchandise as a percentage of national average (-100) for the month. They are based on Board of Trade retail sales indices.



STATE OF THE NATION

From this comprehensive series of charts, covering the main economic factors affecting the state of the nation, the businessman may gain a perspective of the situation governing his operations.





WHO'S BEHIND IT ALL?

SUDAN LEAVE SERVICE



Under contract to the Sudan Government Airwork has been responsible, since the War, for carrying British residents in the Sudan to and from the United Kingdom for their annual leave. Approximately 5,000 passengers a year are carried on this popular service.

AIR TROOPING



Today's troopship is a fast, pressurised four-engined aircraft. Airwork was responsible for this idea and, under a recently-awarded Air Ministry contract, annually provides transport for many thousands of servicemen and their families to and from Singapore.

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These popular air services operate regularly on scheduled flights to East, West and Central Africa, providing passengers with comfortable travel at low cost fares. Airwork pioneered this economical form of air service.

NEW ZEALAND AIR BRIDGE



In New Zealand, North and South Islands are linked by the cargo services of Airwork's subsidiary company, Straits Air Freight Express Ltd. This airline annually carries more than 18,200 tons of mixed cargo. For greater efficiency, an ingenious form of pre-loading apparatus is used.

ATLANTIC ALL-CARGO SERVICE



News has been released that Britain's first all-cargo Atlantic air service will start on March 1st, 1955. Direct routes to New York and Montreal will be operated with modern all-cargo aircraft at an initial frequency of two return flights weekly.

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Airwork Limited was established in 1928 and is now the largest organisation of its kind in the world. Besides operating scheduled and contract air services, Airwork is concerned with the sale, overhaul and maintenance of aircraft and aircraft components, aircraft insurance and the provision of flying training facilities.

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HOME MARKET REGIONAL SURVEYS (cont. from page 53)

River on the Missouri - Arkansas border.

The Association of British Chambers of Commerce have recommended to the committee of inquiry into the electricity supply industry that industrial and commercial **electricity tariffs** should be simplified.

Eastern

WITH the rapid development of six new towns within the region and large-scale expansion of motor manufacturing firms, considerable attention is being given to road conditions and their effect on production. At present it does not seem likely that more than three major improvement projects are financially possible: they are Markgate by-pass, the widening of A5 south of Redbourn and the widening of Thorpe Narrows (Norwich).

At Basildon, Essex, where two years ago there was only one small works, 11 factories are in production 10 are being erected and work is about to start on five others. In all, the buildings cover 1 million sq. ft. and will provide work for 6,000 people. The Basildon Development Corporation have already built 1,600 houses and the number should rise to 6,000 in three years. It is estimated that by 1965 the town should be roughly the same size as Southend (80,000).

Included in the factory area are the new premises of Marconi Wireless Telegraph Co., and 10 acres of building land have been purchased by the Ford Motor Co. for the erection of a new machine shop. This forms part of the £65 million **expansion and modernization programme** which the firm are to carry out over the next five years. Apart from considerable expansion to their main Dagenham plant, Ford intend to develop satellite factories nearby, including a spare parts depot at Aveyley, Essex, and certain buildings at Woolwich Arsenal.

As from January 1, the manufacture of all the **farm machinery** which Ford and Ransomes Sims and Jefferies have developed jointly for use with the Fordson Major tractor, and for sale under the F-R trademark, is being taken over by the latter concern, together with the production of all spare parts. The range of equipment is to be expanded. Home distribution is to be carried out by Ransomes while Ford handle overseas sales.

Vauxhall Motors, Luton, who are at present exporting 57 per cent of their current yearly output of nearly 130,000 cars and trucks, expect, when their £36 million **expansion** programme is completed, to double their sales overseas.

George Kent Ltd., Luton, have with Cam Gear Ltd. formed a new company to produce a particular type of power-assistance under licence from the Ross Gear and Tool Co., Lafayette, U.S. This will augment the demand for the heavier steering gears of the company's manufacture.

British Timken Ltd. are building a new plant at Daventry for the manufacture of the larger sizes of **roller bearings**.

A £100 cheque has been presented by the Plessey Co., Ilford, to one of their tool try-out engineers for an idea suggested to them for an attachment for capstan and other types of lathe.

The new Marconi College at Chelmsford, built to meet the increasing demand for **training facilities** arising since the war, will enable the Marconi Wireless Telegraph Co. to provide for the teaching of a larger number of subjects within the broad field of electronics.

North-Western

THE cotton industry is fighting the good fight for its world position on many fronts — in the utilization of modern equipment, in training of management, in research and design development, in competitive prices. During 1954, installation of new machinery returned to the high 1951 level, and for the first eight months total production was over 8 per cent greater than in 1953.

Changes of ownership of productive units are strengthening the strong and reducing the number of the weak. The establishment of vertical links is growing, a tendency which increases the adaptability of the industry. Discussing these trends at the Cotton Board's Harrogate conference, Sir Raymond Streat, the chairman, referred to current training measures. To date, over 700 responsible individuals have passed successfully through the different **training courses** of the productivity department of the Board.

A full-time work study course has been taken by 181; 177 foremen have attended residential foremanship

courses and another 154 shorter day and evening courses; 74 top management leaders have attended forums or briefing meetings and by the end of this winter some 196 more will have been added.

Another significant development in the field of improved training is the **induction courses** arranged for school-leavers entering the operative ranks of the industry. The seven courses planned for January will be attended by about 450 school-leavers. A good rate of juvenile recruitment is vital in view of the losses of adult workers who, between March-October 1954, numbered some 4,000.

Apart from scarcity of labour, other problems facing the industry include the tightening of quality controls over production and the change in trend from mule to ring yarns, involving considerable capital expenditure. Combined English Mills (Spinners) Ltd. have found, reports Sir John Reynolds, the Chairman, that their **experimental and pilot plant** known as Bayley Mill has proved of great value not only to the combine but to other sections of the trade through its work on new yarns and blends.

A special **processing plant** has been installed at the company's Hall Lane mill to meet the needs of nylon spinning, and the firm's Brooklands mill has been wholly turned over to the specialized production of dyed spun rayon yarns. Courtaulds Ltd., who are the only commercial U.K. producer of spun dyed acetate continuous filament yarns in colours, announced on December 1 a **reduction** of 9d. per pound in their price, a move which will help exporters.

Although between 15 and 20 spinning mills have closed down since the beginning of 1952, the efficient machinery in them has been bought by other concerns and re-equipment generally is going ahead. Production during the first week in November of 20.9 million lb. of yarn constituted the highest output achieved for nearly three years. In view of the current seasonal expansion, the year's figures may well be good. Total production of all **clothes** for the first nine months of 1954 was 2,000 million linear yards, compared with 1,900 million for the same period in 1953.

To effect economies and improve efficiency, F. Steiner and Co., the

dyers and calico printers, recently called in a leading firm of **industrial consultants**. Various alterations and innovations which they advised are to be put into effect.

The **engineering** industries, which in point of value of production and number of employees are the largest group in Lancashire, are experiencing an active time with **vehicle**, **aircraft** and **machinery** makers well occupied. The position in **shipbuilding** and **repairing** could, however, be better. **Loco builders** expect to be busy with orders in hand until the last quarter of this year, with some firm's order books full until 1956. Among large current orders on which Metropolitan Vickers are working is one for 94 diesel-electric locos for Eire State Transport and 40 electric locos for the Blue Mountains electrification scheme in New South Wales.

Working at pressure on both home and export orders, **machine tool** makers in the north-west are extending their productive capacity.

To explain to employees at their Denton, Manchester, works the reasons for the company's expansion abroad and to show them how the overseas plants strengthen the Group's resources and make their contribution to further expansions at Denton itself, Oldham and Son issued with their annual report and accounts a special illustrated issue of their magazine *The Grid*.

Steady progress is being made with the £16 million **reconstruction** scheme at Canada and Langton Docks on Merseyside. Main feature is a new deep-water river entrance into the Langton dock which will give a minimum depth at low water of 19ft, and a maximum depth at high water of 50ft. This will enable the largest vessels using the port to pass through into adjoining docks.

The existing Langton and Brocklebank docks are to become one, and new transit shed accommodation will be provided for seven additional cargo liners. Work will probably continue for another six years, employing about 1,000 men.

Two huge electrically-operated **transporters**, each weighing 600 tons, are now in operation at Bidston Dock, Birkenhead. These 140ft.-high units are the only two in Britain which can unload either on land or into barges. Working throughout the 24 hours, they will help considerably to ensure a

speedy turn-round of ships and a smooth flow of iron ore into the Shotton steelworks of John Summers and Sons.

On Liverpool corporation's Speke **industrial estate** 13,000 people are now employed, an increase of 2,000 on 1949. In the same period, the figures for the Aintree estate have risen from 10,000 to 13,000 and those for the post-war Kirkby estate, which lies just outside the city boundary and has 1,170 acres, have jumped from 4,250 to 8,500. About two-thirds of the factories on this estate are rail-connected, with the corporation providing the railway goods service.

The Huskisson **goods depot**, Liverpool, is being reconstructed on modern lines, including an electrically-operated slat conveyor and a 30-cwt. capacity electric gantry crane.

Part of the answer to Liverpool's parking problem may be a seven-floor garage, now being erected in Tithebarn Street, which will be able to accommodate nearly 700 cars.

Midlands

INDUSTRIALLY the tempo continues to quicken, with the accent on plant expansion and modernization, and with it grows the **labour shortage**. Outstanding vacancies, mainly in the Birmingham, Black Country and Coventry areas, now number something like 45,000. These are largely spread among the main employing industries—miscellaneous metal goods, engineering and electrical products, shipbuilding, vehicles and aircraft, pottery and metal manufactures.

Nearly 4,000 more workers are required in the **building** and **contracting** trades, which are overloaded with work. Housing projects pile up and the rate of factory building is rising steadily. Applications for **industrial development certificates** for the first nine months of 1954 numbered 282, valued at £12 million, compared with 167 and £5.5 million for the same period in 1953.

Expansion of the **motor vehicle** and **tractor** industries is responsible for over one-third of the applications and this, plus the activity in the **aircraft** industry, has been the biggest factor in stimulating demand for **machine tools**. The **light engineering** trades have also stepped up their tooling demands, and home and export orders for machine tools have been showing a sharp increase. As a result, delivery periods

are becoming longer. **Steelworks** are heavily committed and a strong demand continues for sections and joists, plates and black and galvanized sheet. **Re-rollers** are very busy and deliveries are lengthening. Although the engineering and speciality foundries are working to capacity, light foundries could do with more orders. **Hire purchase** business is booming, a reflection of overtime earnings.

The present production of Standard Motor Co., which is running at record levels, is to be increased by one-third, partly by enlarging capacity and partly by installing new plant to improve efficiency. The reorganization will take two and a half years, at the end of which time the company will be turning out 100,000 **cars** and **commercial vehicles** and 60,000 **tractors** for Massey-Harris-Ferguson annually. A larger tractor is to be introduced.

As the motor industry expands, so suppliers are being called on to increase their production. One firm, Girling Ltd., have decided to spend a large sum on their factory to enable it to be in a position to meet the call for its products from the motor trade. A new Girling development—power-assisted steering—has been introduced.

As a result of recent large home and export orders, Guy Motors and their associated company Sunbeam Trolleybus are increasing their labour force. Raleigh Industries, of Nottingham, whose output is already well over three-and-a-half times the pre-war maximum, are building a new one-and-a-half acre factory. A further new major works is planned for the future to meet growing cycle demand.

At Smethwick firm, Flexible Drives (Gilmans) Ltd., in association with a Sheffield company of tungsten carbide manufacturers, have produced what is claimed to be the world's first range of **segmented tungsten carbide burs**. These "Segburs" enable the latest steels used in jet engines to be quickly and easily machined. B.T.H. have installed at their Rugby works a new plant for testing the safety and balance of heavy forgings used in their heavy electrical generating machinery.

State of the Nation

Key Figures in
23 Charts

See pages 54 and 55

EXPORT MARKET SURVEY—Mexico

THE conviction that British industry can sell much more to countries in the northern half of Latin America has recently been expressed by Sir Harry Pilkington, president of the Federation of British Industries, and among the markets to whose current growth and development he referred specifically were Venezuela and Colombia (see PROSPECT, August 1954) and Mexico.

What openings does Mexico, in fact, offer to the British exporter? It is a country which, against a background of scanty resources and technical difficulties, has made tremendous if uneven economic strides since 1939. Symbolic of the strains which have been imposed on the nation was the decision made last April to devalue the peso from 8.65 to 13.5 for one U.S. dollar. This move, which constituted a serious check to confidence, was the price paid for a too rapid industrialization programme accentuated by an adverse movement in the terms of trade and the recession in the United States—a country which has a dominating influence on the Mexican economy.

There was a post-devaluation flight of foreign capital, but this ceased by mid-July and dollar receipts from sales of coffee and cotton began to accumulate. With good crops this year and higher world prices, the outlook has brightened considerably. Although less cotton was planted, the yield was greater due to increased use of insecticides and fertilizers.

It is the intention of the new Council for the Promotion and Co-ordination of National Production to increase the buying power of the agricultural sector, which comprises 66 per cent of the population but has a much smaller share of the national income. This may require a slowing-down in the pace of industrialization, but a solution to the agricultural problem—which has only been planned since 1953—would solve the problem of labour migration to the U.S.A. At present 90 per cent of land in Mexico provides work during only four months of the year.

Great importance is attached to hydro-electric and irrigation schemes: one project in the Yaqui Valley in the north-west has made available an additional 2.5 million acres of extremely fertile land. Such developments will spur demand for better communications and consequently for

road-making and other construction plant.

During the past four years Mexico has doubled its imports, but of total imports in 1953—worth more than £271 million—Britain's share was only 2.7 per cent. Goods shipped from the U.K. included bicycles, whisky, chemicals and agricultural and textile machinery, but the trade pattern has now altered as a result of changes in the import licence list. Last June the Mexican Government increased duties on 400 classifications covering goods considered luxury, non-essential or competitive, and among items affected were jewellery, pottery, toys, radios, refrigerators, textile manufactures and food products.

Most promising openings for U.K. exports are in capital equipment and machinery. Mexican coal mines are being mechanized, a caustic soda plant is to be set up, textile machinery is to be manufactured, production of railway freight wagons has now been started and the construction and assembly of diesel buses and commercial vehicles has begun.

Coke production is being increased and blast furnace capacity stepped-up, while steel tube output is to be expanded. If plans develop, Mexico may in a few years be the world's second largest sulphur producer.

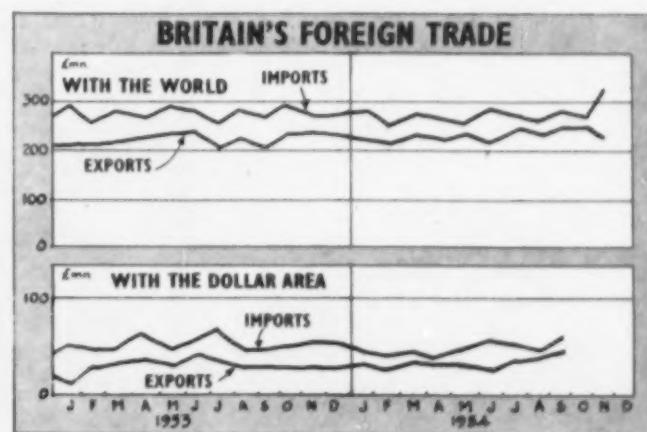
There is a growing demand by Mexican industry for machinery of all kinds and considerable openings exist for public works equipment, power

plant, transport lines and machine tools.

Excellent prospects for plant and materials are offered by the country's oil industry, a nationalized monopoly known as Petroleos Mexicanos (Pemex). In 12 months to September 1954 nearly 700 million pesos were spent on capital development. Eight refineries are at present in operation and capacity is being expanded.

New refineries are planned at Salina Cruz, Mazatlan, and Guaymas on the Pacific Coast; a cracking plant is being erected at Minatitlan and an absorption plant at Atzcapotzalco; and a considerable mileage of internal pipelines is being constructed. A new oil field now being exploited 40 miles to the south of Poza Rica has hastened demand for building materials, municipal plant and hospital and school equipment. Plans are in hand to make greater use of natural gas which is already used in industrial works in Mexico City and Monterey and in private houses.

A significant pointer is that several of the latest Mexican enterprises have been established by "joint ventures" in which foreign concerns and Mexican companies collaborate, and this form of co-operation may well be the pattern of the future in many industries, especially where Mexican manufacture in any particular product has begun. Such ventures already exist for British radio receivers, water heaters, cars, lubricants and soap, and these are working successfully.



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Electricity a Power of Good for PRODUCTIVITY

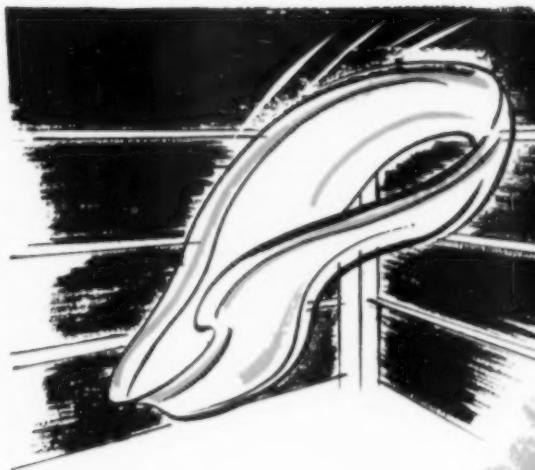
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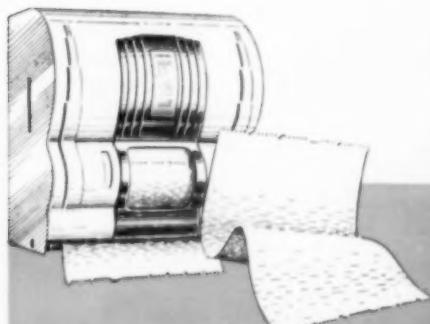
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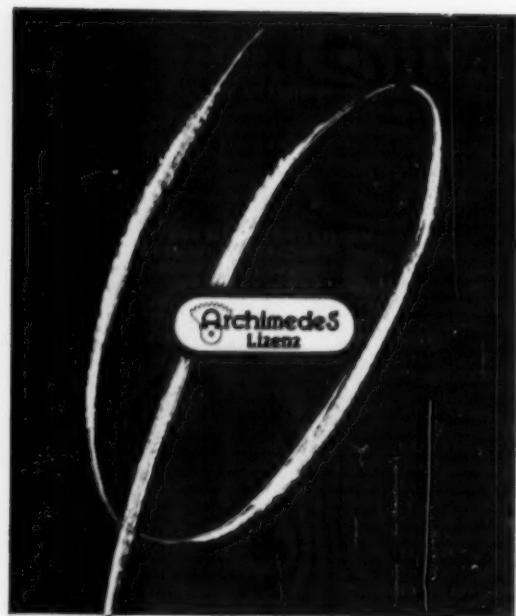
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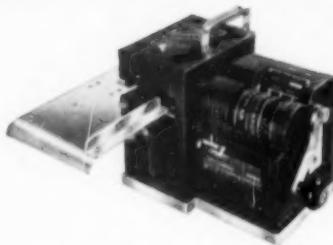
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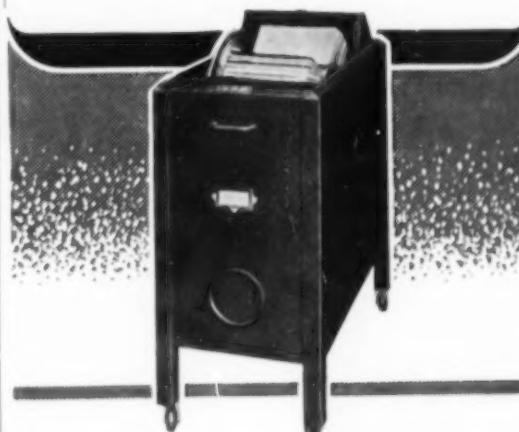
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One Burroughs man solved this problem. The Phonotax Co. Ltd. (weekly telephone cleaning and sterilizing service) have 80,000 separate accounts, and until recently, in London and in provincial offices, figures were copied by hand. As this led to errors and delays, they called in this Burroughs man, Mr. J. G. Winterbottom (left). He showed Phonotax how, with just two typewriter-accounting machines and two abbreviated-description accounting machines, they could halve their accounting time, and obtain up-to-date figures — *all without extra staff*.

FOR EXPERT ADVICE ON

BUSINESS SYSTEMS CALL IN

THE  Burroughs MAN

The March of Business

Elbow Height

THAT present-day industrial designers have something to learn from the old crafts was suggested recently by Dr. C. B. Frisby, Director of the National Institute of Industrial Psychology. He was addressing a conference on "Research and Industrial Productivity" held by the Department of Scientific Research, and he took as an example the design of hand tools, particularly screwdrivers and hammers.

"In the old crafts," he said, "one finds a remarkable variety of such tools, a range of blades, heads and handles that have been evolved by the craftsmen themselves to suit their convenience in the varied demands of their work. . . . Yet in modern light assembly departments one encounters a variety of jobs being done with one tool, obviously not equally suited to them all. Is it unfair to suggest that sometimes the requirement is stated as 'a small screwdriver' or 'a medium weight hammer,' and the rest left to the Purchasing Department?"

Later in his address, on "The Effect of Equipment Design and Work Organization on Operative Efficiency," Dr. Frisby discussed the problem of seating and bench design. He said that for work done standing, the height of the working surface from the ground "should be determined by the height of the worker's elbow. It may hardly be practicable to make benches so finely adjustable as to permit of theoretically ideal conditions for everyone, but it is not difficult to provide, say, five ranges of adjustment, two on each side of an average, which is, of course, not the same for men as for women. It is a cardinal rule that, where the nature of the work permits, bench heights should be those convenient for standing, and seating appropriate to that height provided, so that the worker can sit or stand at will. This alternation of posture can greatly reduce fatigue."

★ ★ ★

MID-SUMMER 1955 should see this country invaded by a greater number of overseas buyers than ever before, here to visit trade exhibitions which have been booked in close succession, to retain the interest of the buyers and persuade them to delay their journey home. The British Industries Fair will be held at Olympia and Castle Bromwich from May 2 to 13, the British

Plastics Exhibition at Olympia from June 1 to 11, the Business Efficiency Exhibition at Olympia from June 6 to 16, and the International Machine Tool Exhibition at Olympia from June 22 to July 6.

* * *

Turning Professional?

IS business management in danger of being turned into a profession? On page 97 of this issue appears a letter from Lt.-Col. L. F. Urwick defending vigorously the idea of professional training for managers, against an attack by Mr. Colin Cooke of Magdalen College, Oxford. Mr. Cooke's speech was quoted and commented on in our November issue (page 65).

Some of the arguments put forward by Lt.-Col. Urwick are quite unassailable. And he points to the fact that in 1951 in the United States there were 380,000 students at university level "majoring" in management subjects. In this country there were at most a few hundreds. But while agreeing with him on the importance of management training, we maintain our

original point that management is not a profession.

With due apologies to Mr. Stephen Potter, we would like to define management as "delegated businessmanship." In a firm large enough to require managers, each of these has delegated to him part of the work which in a very small firm may be done entirely by one businessman. And this work, aimed at satisfying the needs of customers, can definitely not be classed as a profession.

The distinctive feature of a profession is that someone has to study for many years to build up a fund of knowledge—such as on law or accounting—and this is then retailed by the professional man on a fee or salary basis. Over the years he also accumulates experience in handling his knowledge, but the stock of knowledge is a fundamental and first requirement.

This is not so in business, where the "knowledge" required does not so much concern a permanent body of principles, as a changing body of experience. The businessman knows which firms could supply him with raw materials to meet a particular order, and what sort of price level they will charge (or if in the case of a new order he doesn't know, he soon finds out). He knows the labour market. He knows what his competitors are selling. None of this changing body of experience could be described as a suitable set of principles on which to found a profession. And if managers were to regard themselves as belonging to a profession, there would be a danger

AN IMPORTANT NEW SERIES

About the Executive Himself

Next Month BUSINESS will publish the first of a down-to-earth series of articles specially written about The Executive himself. These are the result of months of research into subjects on which businessmen are naturally reticent.

- **Recruitment and Training** will be reviewed in February. A dozen firms, of all sizes, have provided information on this subject.
- **Health of Executives.** The March issue will describe both how executives can keep fit and what far-sighted firms are doing to safeguard the health of their top men.
- **Executive Salaries**—a vital, though controversial, question—will come under the BUSINESS spotlight in April.

Other subjects of personal interest to the Executive will be covered in later issues.

THIS MONTH'S COVER PICTURE

The teleprinter switch board at Shell House—"nerve centre" in the group's communications network. On page 73 of this issue is the transcript of a BUSINESS Brains Trust on "Communications in Industry."

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many of the greatest firms in the country (where time and motion study precedes action) choose for correspondence the Emidicta System with its 6 and 12 minute recording and wide range of accessories. For it is the end product which counts—the letter in typed form!

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that they might too often look inwardly, to their stock of knowledge. They might pay insufficient attention to the outward changing market conditions—to the problems of buying well, and above all, satisfying their customers.

Whereas nobody could hope to be a successful lawyer without studying law, there are countless successful managers who have never studied management as an organized body of knowledge. This is not to deny that their success might have come easier and earlier if they had had facilities for study. But short management training courses, of from one to three months, given to men who have already had practical experience in industry or commerce, may be better than long academic courses given only to the more limited group who go to university. Our stand against regarding management as a profession is a stand against making industry more rigid, with the best positions reserved for those who pass the right examinations at the right time. Many who were never so lucky nor so clever have made, and will in future make, excellent managers.

★ ★ ★

THERE will be a one-day conference of the Birmingham branch of the Office Management Association at the Grand Hotel, Birmingham, on January 31. The theme will be "Correspondence and Mailing—Your Mail and how to handle it." On January 17 the North-Western Polytechnic, London, N.W.5., begins a course of 10 Monday-afternoon sessions on "Office Methods and Management." At the same college on February 3 there begins a course of six Thursday-evening lectures on "Office Mechanization." And at the Regent Street Polytechnic a course of 14 Wednesday-afternoon sessions on "Report Writing" begins on February 16.

★ ★ ★

Social Accounts

ROY HARROD, the celebrated Oxford economist, urged those who attended the recent Golden Jubilee celebrations of the Association of Certified and Corporate Accountants, to study the "social accounts" evolved by the Treasury during the last 10 years.

In distinguishing between the role of the accountant and that of the economist, Mr. Harrod pointed out that "the accountant's duty is to adhere to hard facts—payments recorded or invoices

The Editor, the Advertisement Director and the staff of BUSINESS wish all their readers and advertisers happiness and prosperity in the New Year

People Products Places—I

EXPORT EXPERT—A specialist in selling British goods in America is Adam Johnstone, who has just returned home to establish his own marketing consultancy here. Mr. Johnstone believes it is necessary to live in a market and absorb the way of life and thinking habits of the people if one is to achieve maximum success in selling.



MOBILE SHOWROOM—To stimulate sales and provide a more direct approach to prospective customers, the Startrite Engineering Co. Ltd. have recently equipped a new mobile demonstration van. This will display the company's range of power tools and, in collaboration with local dealers, will visit factories all over the country.



QUICK OPENER—Claimed by its manufacturers to be the first tear-strip corrugated case made in Britain, this carton will be on view at the Packaging Exhibition at Olympia (Jan. 18-28). One obvious advantage is that the contents cannot be damaged by knives or other opening tools.

P.P.P. Continued ▶



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BUSINESS

in a file. . . . The economist is more interested in motives and purposes."

Mr. Harrod naturally takes the economist's view that depreciation allowances on industrial equipment should be stepped up to replacement cost. He also believes that the Inland Revenue should allow firms to choose their own rates of depreciation on various types of equipment. As the social accounts that he wants company accountants to study are prepared by economists and statisticians, not accountants, he is clearly making a subtle attempt to win accountants over to his views.

* * *

FRANKLIN Life Insurance Company, U.S.A., the first commercial company to install the Univac electronic digital computer, expect the machine to pay for itself in four years or less. Readers will recall that the leading article in the November issue of BUSINESS, on "Electronics in the Office," discussed the types of computer equipment already available or soon to be available.

* * *

Putting it Across

SOME pointers on how to get the co-operation of workers in introducing technical changes were given at the recent D.S.I.R. conference on "Research and Industrial Productivity" by Lewis T. Wright, general secretary of the Amalgamated Weavers' Association.

First, he suggested that "a carefully prepared lecture filled with 'unassailable' argument as a rule gets nowhere, unless the arguments are clearly for the immediate wellbeing of the group."

Second, "the group must be shown the whole picture, and if it is discovered that part of the picture has been hidden, however trivial, the group's reactions can be disastrous."

Third, "vagueness, the superior approach of 'I know better than you,' and the glossing over of factual information all tend to irritate the group itself, even though perhaps through only one or two members."

Fourth, "if technical jargon is used, communication will fail because workers will not understand it and will not ask what it means. Not understanding, they will reject it."

The second of these points is easy to state but extremely difficult to apply. It also tends to conflict with the fourth point, for if technical jargon is not understood by the workers, then giving the whole picture is virtually impossible without making the explanation long and boring—which would defeat the object. What the

People Products Places-2



ON TOP—Careful research has resulted in a new structural system for roofing large areas, termed "lattice shell," which is claimed by its manufacturers to give exceptional adaptability in design. One feature of the system is that the "shells" can be arranged to admit daylight wherever it is required.



FLYING LAB.—New developments in electronic equipment have resulted in a three-fold increase in the "productivity" of airborne geophysical surveys being made by a Hunting Group company in Canada. The process of searching for iron, oil, uranium, copper and other materials has been greatly speeded-up.



THE SHAPE OF THINGS TO COME?—Resembling a scene from one of H. G. Wells' futuristic novels, this "load despatch office" is the focal point of the new communication system recently installed for the Electricity Supply Board of Ireland. The system, which largely operates over power-line carrier circuits, brings the whole power network of the Irish Republic under the control of the Board's Dublin headquarters.

P.P.P. Continued ►

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workers generally want is a simple picture, provided that it discloses the real aims and expected results of a change, and hides nothing which affects their interests.

★ ★ ★

RECENT tests by the *Printing, Packaging and Allied Trades Research Association* have shown that a pack is likely to receive rougher treatment on a rail journey than by road. But there is little difference in the journey hazards between "passenger" and "mixed goods" train transport.

★ ★ ★

Challenge to Convention

AT a recent display of one of his company's new products, A. C. Hazel, managing director of Hursel Ltd., mentioned that "women's tastes are the main obstacle to efficient home heating." The new heating appliance which Mr. Hazel was displaying is claimed to halve the domestic fuel bill, but of course it looks different from the conventional fire grate.

Not only in the domestic heating appliance industry, but in many other industries, new products are coming on to the market which at first sight may outrage conventional tastes. One of the problems of modern designers is to try and compromise with conventional tastes, designing in sympathy with them as far as possible, without losing anything of the newly-won efficiency. But the advertising industry faces an even greater challenge, to make the new designs acceptable to the customer. As the French say, "Only change is permanent."

Letters

The Editor, BUSINESS
SIR,

Your recently-published directory of office equipment is as necessary to managing executives as the dictionary to the average typist. And that means very.

D. A. C. BUTLIN,
Director of Public Relations,
The National Cash Register Co. Ltd.,
London, N.W.1.

The Editor, BUSINESS
SIR,

Your directory will prove of great usefulness to overseas customers.

H. GLAZER,
Manager,
Israeli Printing & Duplicating Co. Ltd.,
Tel-Aviv.

People Products Places-3



CANADA-BOUND—John A. Wellings, who supervised the recent modernization of High Duty Alloys' casting division at Slough, has been appointed director and vice-president of Canadian Steel Improvement Ltd., an associated company. Mr. Wellings will play an important part in the firm's plans for greater production, which include the building of a new foundry.



COLOUR IN THE FACTORY—A feature of the giant new E.B.M. plant at Spango Valley, Greenock—this bay alone is one-eighth of a mile long—is the colour scheme used on the interior. Throughout the entire works and offices, doors, walls and ceilings have been painted in a variety of colours, thereby breaking up the continuity of large sections and creating better working atmosphere.



"SHAVE, SIR?"—A novel method of boosting a new product was demonstrated recently by a local representative of Sunbeam Electric Ltd. when he invited more than 30 Southampton shopkeepers and salesmen to breakfast at a hotel—on condition that they came unshaven. After breakfast, each guest was provided with one of the firm's new electric razors and invited to try it out for himself.

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COMMUNICATIONS IN INDUSTRY

A 'Business' Brains Trust on HOW ★ WHAT ★ WHEN



"... no efficiency at all
in transmitting information
up to the top"

We present on the following page an edited transcription of the discussion, as recorded, at a Brains Trust recently held by BUSINESS. The Editor took the chair, and the members were chosen to represent both top management and the trade unions, as well as experts with a professional interest in communications. The chief conclusion was the need for improving communications upwards — from employees to management.

Points Discussed

1. What to Communicate

- (a) What information are employees interested in?
- (b) How to extend their interest, allay suspicions and fears
- (c) What information should be restricted, what given out and what available on request?
- (d) Whether to give information on orders won or lost

2. How to Communicate

- (a) Presenting financial results to employees
- (b) Explaining the company's products, their uses and markets
- (c) Putting the new recruit in the picture
- (d) Improving relations with the local community
- (e) Staff meetings and house magazines
- (f) Group meetings and joint consultation
- (g) Personal contacts and the art of listening

SPEAKERS

G. H. COPEMAN, PH.D.
Editor, BUSINESS, in the chair

N. I. BOND-WILLIAMS
B.Sc., A.I.M., M.I.I.A.,
*Managing Director,
Aston Chain & Hook Co. Ltd.*

E. E. FIDLER
*Communications Consultant,
Shell-Mex & B.P. Ltd.*

D. BASNETT
*Education Officer,
National Union of General and
Municipal Workers.*

J. W. WHITFIELD, M.A.
*Reader in Industrial Psychology,
University College,
London.*

W. D. GARNER
*Public Relations Officer,
Monsanto Chemicals Ltd.*

R. M. MCKINNON, M.A.
*Editor,
"Personnel Management, Welfare and Industrial Equipment."*

'Business' Brains Trust

How to Create Interest and Allay Suspicions among Employees

The BUSINESS Brains Trust on "Communications in Industry" was opened by Mr. N. I. Bond-Williams, managing director of Aston Chain and Hook Co. Ltd.

MR. BOND-WILLIAMS: To maintain interest is the important thing. Ultimately that interest is going to be an important incentive towards effort.

Interest varies in proportion to the amount of information which people are given in which to be interested. To that extent employees should be given all the information for which they ask, and in which they show any interest. They should not be deliberately kept out of anything. That does not mean that I would publish a thing like the Encyclopaedia Britannica telling them every conceivable detail about the concern; that would be a waste of time. My experience is that employees do not want a great deal of the information which some experts think they really do want.

THE CHAIRMAN: You would select, therefore, very rigidly?

MR. BOND-WILLIAMS: No, I would not select rigidly; I would give employees the information they wanted. I would start by giving them little bits which they obviously wanted, and wait until they extended their area of interest to other fields. Then I would provide them with information in those fields as well.

There is, however, one danger. Information may get into the wrong hands—into the hands of competitors. One has to be alive to that danger, and provide that certain types of information are issued in such a way that though employees can take advantage

of it, it is not possible for them to take it elsewhere.

THE CHAIRMAN: A study of two big American firms made by Princeton University in 1949 showed that employees could put to best use these three types of information:

- (i) Anything which gave them a better insight into their work, and its relation to the work of others in the firm;
- (ii) Anything which gave them a sense of belonging to the firm; and,
- (iii) Information which improved their sense of status and importance as individuals in the firm.

MR. BASNETT: The extent to which information is passed on must, to a very large degree, be based on the needs of the plant itself—that is, the needs of a particular factory. While we are dealing with communications we are also dealing with the wider field of industrial relations; we have to look at those problems or those factors which promote bad relationships. We should discourage the suspicions and fears which came to us through the bad industrial conditions of the 19th century, and which are still with us in this century. To a greater or less degree some of the information will depend on how much these suspicions and fears remain.

One of the factors that can and does produce bad industrial relationships is the greater use of scientific management. We are all conservative and object to change, and scientific management is increasing the rate of change in industry, and therefore is building up forces which need explanation.

But, once again, the explanation must depend on the type of industry. There is no general answer as to the extent to which employees should, or should not, be brought into the picture. I agree with Mr. Bond-Williams that they should be brought in as far as possible in everything. I

do not agree that you should restrict them to what they appear to want to know.

But I think that there must be a difference between what is available and what is given to them. In other words, certain types of information can be available if they wish to have it; other types of information can be automatically given to them by interviews, by (shall we say) circulars, the house magazine and the notice-board.

MR. FIDLER: I want to make a point on the subject of telling employees about orders won or lost. Admittedly it depends largely on the type of employee, but I cannot imagine it is going to be of any great interest to a man in the factory to know what was lost or gained in the way of orders. The man on the road is the man who can do something about this, not the man in the workshop. The latter couldn't care less.

MR. BASNETT: I take issue on that. I do not agree with it. The man in the workshop is interested in what orders are lost or gained. There is nothing worse for a man's sense of security in industry than to get a rumour through the grapevine, "We've lost such and such an order," and to presume redundancy. A prime charge on industry is to give a man a sense of security, and to give him some idea that the industry is working in certain directions for his benefit. To allow any rumours to circulate about loss of orders, and consequent redundancy, without giving the facts to the workers, can cause bad consequences in industrial relations.

Cure for 'Worry'

MR. FIDLER: There is very little the man in the workshop can do about it if a salesman has lost an order.

MR. BASNETT: Perhaps he cannot do anything about it, but it is the effect on him which we are worrying about.

MR. GARNER: Mr. Basnett's point is surely that the man's mental well-being is based to a great extent on his knowledge of the whys and wherefores. Whether he can do anything about it or not, it is important that he should know what the background story is.

THE CHAIRMAN: Then you feel that the firm should explain that too?

MR. GARNER: One would normally require evidence that the grapevine was already discussing this particular point. One would not rush out as soon as an order has been lost—if that is the example—and say why. In the average firm it very quickly becomes



"... a personal mailing system to employees' homes is more intimate"

apparent when misinformation is around, and then one must get to the employees very quickly with the facts.

THE CHAIRMAN: I was reading an article recently about the United Sound and Signal Company in Pennsylvania who started a system for mid-morning discussions over coffee, by which information was continually fed down. The different groups in the firm heard it and talked about it. If an order was lost, the unfortunate thing happened that the whole plant's morale fell away in five minutes. For the rest of the day they were upset about it instead of getting on with their jobs.

MR. BASNETT: We must distinguish between the day to day loss and gain of orders and the picture over a period.

MR. BOND-WILLIAMS: There is a further point on this subject. Mr. Basnett actually made it earlier on. That is, you cannot use this type of information unless the ground is already prepared. If there is a serious fear or uncertainty of employment, and the company in which the people work has no obvious policy, it is bad to issue that kind of information about loss of orders.



N. L. BOND-WILLIAMS
A long-standing fallacy that you can pour ideas into people

talking about it and organizing communications.

THE CHAIRMAN: Do you think that it is the job of communications to help in creating the conditions you want to obtain in industry? Or do you say that the conditions must first be created and then you can have the communications?

MR. BASNETT: Well, certainly communications must play a very large part in disseminating the type of information needed to create the conditions.

MR. BOND-WILLIAMS: This does bring out a point. Somebody stated it very succinctly: "Industry has developed first-class methods of projecting information down the line, it has tolerable methods for spreading information laterally in groups, but it has absolutely no efficiency at all in transmitting information up to the top." It is essential to speed-up the communications side upward. I regard this as very much more important than the communications downhill, which we have already got pretty well taped.

THE CHAIRMAN: That brings us to our next point: How to communicate.

MR. GARNER: Here is a specific example of how we communicate financial results in our firm. We produce both a half-yearly report and an annual report which is a good deal more elaborate, I believe, than the majority of companies publish.

When we began this system of communicating our results, and commenting on them at the same time, we posted the report to the home of every employee. All received this information. But we subsequently discovered that the full information was only of interest to a relatively limited percentage of our employees. Therefore, we now work on a system whereby we only issue our financial reports within the company on certain levels. I do not necessarily mean top levels, I mean



D. BASNETT

The representative system should be maintained

MR. BASNETT: Could I emphasise that? The point has been made that it is no good talking about communications in industry until you have good industrial relationships. These are very largely dependent on company policy. One must make sure that the company policy is such that it can remove the fears and suspicions of the people working in the industry. In other words, it is a prime charge on the company that the persons working there shall enjoy as high a standard of living as possible, and shall have some security within that industry. When you have done that, you can start

Some Key Statements

► *Employees should be given all the information for which they ask, and in which they show any interest*

► *One has to . . . provide that certain types of information are issued in such a way that though employees can take advantage of it, it is not possible for them to take it elsewhere*

► *Scientific management is increasing the rate of change in industry, and therefore is building up forces which need explanation*

► *The man in the workshop is interested in what orders are lost or gained*

► *A prime charge on industry is to give a man a sense of security*

► *We must distinguish between the day to day loss and gain of orders and the picture over a period*

► *We hold meetings in each of our work centres. The managing and other directors speak at these on our financial results, and answer questions*

► *We deliberately prepare the canteen accounts in the same form as our monthly budget statement . . . Our people understand the canteen accounts. It follows that they should be able to understand the company's accounts.*

► *Our products have no apparent use at all. However, our customers have been extraordinarily helpful in supplying us with samples of the products into which our components are built. We have had many exhibitions*

► *We invite the Press to see over our works, and do in fact get quite a good amount of editorial space*

► *The house magazine must be essentially an independent organ*

► *We post our house magazine to the home of every employee . . . we want to know it gets to the man . . . his family . . . his friends*

► *We pay our people to meet in the company's time—without management representatives—in order to talk*

► *With the group system, they can say what they think without fear of victimization*

► *Our experience is that the group is responsible . . . people are generally, in fact always, very kind in their criticisms*

► *In order to communicate, the person who makes the approach must be prepared to listen*

'Business' Brains Trust

levels of execution, if one might call them such, where we know that they are of interest. But at the same time we have a standing offer which is very widely publicized within our company, that any member of our organization can have a copy of the report on request.

MR. MCKINNON: The University of Minnesota recently investigated communications procedure. One of its definite conclusions was that the use of a personal mailing system to employees at their home addresses was much better than actually putting the information on a notice board.

MR. FIDLER: It is more intimate.

MR. MCKINNON: More intimate, and it gave them a sense of importance, which is significant in view of the fact that industrial management today is trying to find some way of developing personal responsibility in its workers.

MR. BASNETT: I know one large company which distributes to its employees a summary of its annual report. The full report is available on request.

MR. GARNER: I was coming to that. Having decided not to send out the full report to the whole body of our employees, we do, through the medium of our house magazine, publish a special report to the employees. This is in no way a distortion—but is very carefully produced as a simplification.

MR. BASNETT: Is any attempt made to explain the meaning of the report?

MR. GARNER: We try to do that in the text which goes with the report. It goes out as a letter from the managing director to the employee. Also, we hold meetings in each of our work centres. The managing and other directors speak at these on our financial results, and answer questions.

MR. BOND-WILLIAMS: Our work people run the canteen. We deliberately prepare the canteen accounts in the same form as our monthly budget statement, so that our company's monthly comparison of performance against budget is in the same terms. Our people understand the canteen accounts. It follows that they should be able to understand the company's accounts.

THE CHAIRMAN: So much for financial results. May we now turn to the product itself—particularly in cases where workers have no part in the "end product," or where goods are being made for export. For example, Pond's Extract Company have quite

elaborate exhibitions and talks about where their products are going overseas. Photographs show the type of people in these foreign markets, and their way of life, and the type of shop where the products are sold.

MR. WHITFIELD: One problem in the Ministry of Supply factories during the war was that they were often not able to tell the workers about the end product. Workers complained about these security measures, and in some cases it paid to relax the regulations in order to arouse worker-interest.

MR. BASNETT: It is very important. Many companies arrange exhibitions of their completed products for their employees. It is particularly important where a firm is making for the export market.

MR. BOND-WILLIAMS: We have a particular problem in that our products have no apparent use at all. However, our customers have been extraordinarily helpful in supplying us with samples of the products into which our components are built. We have had many exhibitions of various products and apparatus in use for which we supply the raw material.

Showing End Products

MR. GARNER: We are probably in even a worse position. In the chemical industry a lot of the employees, even those working at the plant, do not even see the product at all. It goes through miles of pipes and frequently goes straight into drums at the other end. We try to answer the problem in precisely the same way as Mr. Bond-Williams. We go to our customers, and by their courtesy and co-operation we are able to show the end products.

THE CHAIRMAN: Let us now turn to another "how-to" aspect of communications. The new employee. How can he, or she, be told about the job and the firm?

MR. MCKINNON: H. T. H. Peck, the Leicester hosiery manufacturers, take

each girl, as she comes in, round the factory and explain the various processes as simply as possible. They also give her an introductory booklet. They explain how her pay is worked out, how much she should expect after income tax has been deducted, and what the various amenities are.

Guinness begin even earlier. With some of their boy applicants they ask the parents along to the interview—not only in order that the boy shall be reassured by his mother to join, but also that the mother herself will be reassured by the personnel manager that her boy is going into something which is worth while.

THE CHAIRMAN: The Imperial Smelting Corporation at Avonmouth have an initial training course for all employees. This lasts two days. While it concentrates on safety training—as they are dealing with smelting furnaces—the course also includes guidance on such matters as "Where is the Canteen?" and "What sporting facilities are available?" as well as information about the company's history and products.

MR. BOND-WILLIAMS: We do it with classes, particularly with young apprentices and the people we believe to be taking up permanent employment with us. In our circumstances, in the Birmingham area, we are using largely semi-skilled labour and the cost of long introductory courses would be prohibitive. We get over it by spending about half a day with new starters, and by being rather particular about our employment handbook, which explains our policy, the rules of the place, and so on. Very soon, with the other arrangements that I propose to describe later on, they get into the swing.

MR. BASNETT: There are three main requirements in this regard. First, the employee wants to know his conditions of work. Secondly, his wages. Thirdly, who is his boss. It is essential he should know these from his first introduction. Beyond that, one wishes



"There is nothing worse than the managing director who says, 'My door is always open'!"

to develop an interest in the company itself. The handbook is one method of helping that.

Another is for managers to hold meetings with employees, and describe their particular function in the industry so that employees get a very clear picture of it. Attendance can be voluntary.

THE CHAIRMAN: Heinz do that.

MR. FIDLER: Induction courses can be very, very costly. No useful purpose can be served, surely, immediately a man enters a business, in starting to train him in the manner we are discussing. I think you can wait until he makes the grade—say three or four months.

MR. WHITFIELD: One important point is whether you can get over a verbal description until employees have got some sort of feeling about the organization. Here is an odd thing. Recently we went to two or three firms and interviewed employees to find out how much they understood about how their bonus payment was calculated. We asked them to work out what their bonus would be for each day and each week and each period. We found there was no relation between the accuracy of their estimates and their verbal understanding. This shows how little they understood the verbal explanation. That is one of the problems we are really up against.

MR. BASNETT: That is also my experience.

MR. WHITFIELD: It is similar to the skill of the very good garage mechanic who knows what is wrong with your car, but cannot tell you. The same non-verbal appreciation of the situation really does come into the picture in a very big way.

MR. GARNER: We begin our indoctrination before people even consider becoming our employees, by holding open days to which our employees can invite their families and friends to come and spend an afternoon at our factories, and see for themselves the conditions of employment, the nature, and importance of the work. Little displays show where the products go. We like to think that some of the young visitors are sufficiently impressed, that in due course they will come and work for Monsanto.

MR. BOND-WILLIAMS: We have a very definite, positive policy of interesting the local community through the services of the local Press. We invite the Press to see over the works, and do in fact get quite a good amount of editorial space. The intention of that is not to advertise our products, but

the very point that has just been made by Mr. Garner; and it seems to be welcomed both by the publishers of the papers, who regard it as interesting news, and by the people in the district. MR. MCKINNON: Accles and Pollock actually buy weekly space in the newspapers to achieve the same end.

THE CHAIRMAN: And so do Lyle and Scott of Hawick, Scotland. They abandoned their former house magazine and instead arranged for space in the local paper to talk about themselves and thus weld the firm and the community together.

But we must move on. What about the equipment available for promoting communications?

MR. BASNETT: The correct use of the equipment available to a large extent depends on what is to be communicated. But only by personal contact can you create the right atmosphere for using modern communications equipment to its best advantage.

MR. FIDLER: There is no doubt about that.

MR. BOND-WILLIAMS: Granted there has been a tremendous advance in all the equipment that can be used for communicating, but you never get anything into anybody unless either his



R. M. MCKINNON
Reassured by the personnel manager

MR. GARNER: Certainly, and at every level. We also place a tremendous amount of value on our house magazine. It is a method of communication within the company. But I must stress that we do not use our house magazine for propaganda either on behalf of the employees or on behalf of the management. It is an instrument for exchange of information between all sections of the company.

THE CHAIRMAN: Does that mean the independence of the editor?

MR. GARNER: It does, indeed. Anybody, in my view, who uses a house magazine for the purpose of propaganda of any kind is wasting his time. The house magazine must be essentially an independent organ, for exchange of news and views between the various sections of the company.

THE CHAIRMAN: It must have the confidence of all members?

MR. GARNER: Yes. And referring to what we talked about earlier on, we post our house magazine to the home of every employee. We do not distribute it within the company. There is a double reason for that—first, we know it gets to the man we want, and secondly we know his family sees it—not only his family, but his friends.

MR. BOND-WILLIAMS: I would like to know whether by propaganda Mr. Garner means his understanding of "pep" talks. It is sometimes difficult to differentiate between propaganda and information. With the people in a factory, the thing in which they are primarily interested is the work they are doing. Otherwise they would not be in the place at all. If they are interested in the work, then one of the things that the house magazine must do, if it is to satisfy them, is to give them adequate information about what goes on. Not what goes on on the stage in the canteen on Thursday evening; or what goes on or the sports



W. D. GARNER
The information was only of limited interest

eyes are open or his ears are open. There is a long-standing fallacy that you can pour ideas into people like you pour water into a bottle. You cannot get the water into the bottle if either the neck is too small or if there is a cork in the bottle. The real problem is getting the cork out and making the bottle bigger.

MR. GARNER: In our company we place a good deal of value on the use of talks to our employees, at every level. We hold staff meetings on any subject which it occurs to us might be of interest to our employees.

THE CHAIRMAN: In the company's time?

'Business' Brains Trust

field on Saturday afternoon; but what goes on in the factory in which the people are interested. Is that propaganda, Mr. Garner?

MR. GARNER: Mr. Bond-Williams and I need not disagree for a moment. I consider a house magazine should be used exactly as he says. To explain why a certain committee has been formed; why certain kind of action has been taken; how a particular product is used; what is the importance of new plants which are being built. All those things are the essence of what should go into a house magazine. But it should not be used by management as an instrument for putting employees into a situation which is either disadvantageous, or which they have not had a proper opportunity of considering; or for employees or unions to exercise pressure on management. That is what I mean by propaganda.

MR. BOND-WILLIAMS: We have a use for our house magazine connected with the particular method by which we permit all our people to meet and discuss. The system we use is to encourage, in fact to pay our people to meet in the company's time—without management representatives—in order to talk; and we believe by making these arrangements people will talk more freely than under any other circumstances.

THE CHAIRMAN: How many are there in a group?

MR. BOND-WILLIAMS: About a dozen. The groups are designed not to be so large that people feel unable to take part in a discussion; and at the same time not so small that any individual is able to bias them one way or another. Our feeling is that with this arrangement people will express themselves more freely than under any other arrangement. I am not criticising joint consultation, because joint consultation is better than no consultation, but our view is that we must go farther than that and make it as easy as possible for people to take part in these discussions.

Our experience, then, is that we have in fact widened the neck of the bottle, or if you like, taken out the cork. We have made it possible for a very much greater flow of facts to be exchanged between various groups, and particularly to speed the *uphill* process. By avoiding the face-to-face meeting of teams of, say, half a dozen managers and half a dozen workpeople, we get the reduction rather than the extension of the "side" idea. With our method,

discussion does not deteriorate to such subjects as the quality of the lavatory paper and the tea.

THE CHAIRMAN: How does the material get *up* the line?

MR. BOND-WILLIAMS: We arrange for this in two ways:

- 1—Direct verbal, oral contact from group to group leaders; and
- 2—A co-ordinating committee at which each group is represented by the group leader.

On the co-ordinating committee the group leaders are in proportion to the various levels in the organization. There are 12 groups for the workpeople, only three groups for various levels of management. Therefore on the co-ordinating committee the balance is probably in favour of the workers' groups and discussion is consequently reasonably free. Any point that those people feel should be transmitted, is transmitted to the management executive committee.

Verbal Reports

THE CHAIRMAN: Do these transmissions take place on paper or is it an oral report?

MR. BOND-WILLIAMS: The reports are verbal at each level, and a report is brought to the management executive committee by, in our case, the lady who does our personnel work, and acts as secretary to the group leaders' committee.

We also use our house magazine as a minute book for the minutes of all group meetings. Those groups who wish to publish their minutes are free to do so. They need not publish them if they do not want to; or they are not obliged to publish *all* their minutes, they can reserve some. If they say a lot about what they think about me—well, they probably don't print that, but they have said it just the same. They print what they want to print in the house magazine and that is a



"We like to think that some of the young visitors are sufficiently impressed"

permanent record of what has been said and a backing for what is said at further stages of the chain.

We find that the house magazine is read by everyone in the place because everyone has made a contribution to it, and everyone's name is in it.

THE CHAIRMAN: But supposing an employee has a criticism of the managing director. He might not like his name to go on that minute in the house magazine, therefore he might not bring up the criticism in the first place.

MR. BOND-WILLIAMS: Well, they are not obliged to publish that minute. We have two groups who never publish their minutes.

THE CHAIRMAN: Can they publish a minute without the name of the individual?

MR. BOND-WILLIAMS: Yes. They can say "The group decided that . . ." People in the factory have told me that with the group system, they can say what they think without fear of victimization.

THE CHAIRMAN: But does not the withholding of names lead to irresponsible criticism?

MR. BOND-WILLIAMS: Our experience is that the group is responsible. We find that people generally take a responsible point of view.

MR. BASNETT: That's a very important point. You don't create a democracy by formulating constitutions or by setting up joint consultation, but by encouraging an attitude of mind. It is the creation of that attitude of mind which is very important. In joint consultation we go back to first things, that is getting over first of all the policy of the company and making sure it is firmly understood.

Joint consultation at what level? The attitude in this country so far is that joint consultation must start on the shop floor, and the trade unions in general prefer to see the shop stewards used for this purpose.

Two companies with which I have dealt agreed with us on the method by which the shop stewards shall be elected. They have agreed with us on a constitution for the shop stewards' committee, and their position within the industry, which is posted in several parts of the factory. They also verbally welcome each shop steward who is elected and explain to them their position.

In these two companies the shop stewards' committee is used for two-way communication. At their meetings the policy of the company is explained and comments are asked for.

There is also something to be said

for consultation at the top level. The majority of the larger industries at least do attempt to make sure that all policy decisions are discussed with the trade unions first of all. And, most important, the discussion takes place prior to a decision being made. This is as important at the lower levels as it is at the higher levels. As a trade union official, there is nothing more galling than to have your members upset by a policy decision which may be based on sound reasoning but of which you have no knowledge, and of which your members have no knowledge.

THE CHAIRMAN: Yes, but what about the other problem? There is nothing more galling than for the foreman to be left out of the picture. How do you deal with this in your scheme, Mr. Bond-Williams?

MR. BOND-WILLIAMS: In our case, after our junior board has met—that is, the management executive committee—we call it our junior board as there are fewer letters in it—we meet the fore-



E. E. FIDLER
Induction courses can be very, very costly

which is directed at the inefficiency of a manager or a particular clerk, it is always veiled in such a way that it becomes a problem for the particular director or the departmental manager to find out what the point is, and discover the real source of the trouble.

There is no harshness; and the result of that is that people take quite kindly to the arrangement and all the intermediate members think that it is all right. If it were used wrongly by senior managers and they took advantage of this sort of information to apply harsh methods in the controlling of their business, then the whole thing would break down. We admit that that is a possible weakness. We have to train our management to suit the circumstances.

MR. BASNETT: Here is an example of joint consultation. A company I know were thinking of following a certain policy. They called in the trade union official and asked for his views and whether he could agree—in principle—to the proposed policy. When he had agreed the policy was put first to the foremen and then to the shop stewards. In both cases it was put to them in principle. Then a series of meetings were called to thrash the plan out in detail at the level of the works floor.

I think that is very important; the question of policy in the first instance and detail in the second instance. The attitude of co-determination is important, actively bringing in the workers at all levels. That in itself will provoke a real interest in joint consultation.

May I make one further point. There is nothing worse than the managing director who says "My door is always open"—which really means it is firmly closed and it is hard luck on the employee who walks in. It is not a question of approachability. Representatives have got to go down—not in any sense lower down the scale—but they have got to go to the workers and



J. W. WHITFIELD
How little they understood

men and discuss any points that have been transmitted to the junior board. What is more, we do this before the publication of our house magazine and before advising anybody else of any decisions that have been reached. The foremen, though at first a little sensitive about this arrangement, have now decided that they like it very much.

The extent to which there is any bypassing, which is small, is helpful to the foremen rather than a hindrance, because there are certain cases where a foreman welcomes that a scrap of information should travel up by some different channel.

With our scheme we have found that people are generally, in fact always, very kind in their criticisms. They will fall over backwards to avoid hurting anybody, even if theoretically they should dislike them quite considerably. So if a criticism comes up

tell them themselves. They should make themselves available, not say "we are available."

MR. FIDLER: We have a public address system. By this our managing director speaks to the canteen, the reading rooms, the writing rooms, the billiard room—all over the firm.

MR. BASNETT: That is far better than putting notices on a board, but it is a bit reminiscent of the "big brother" attitude. I think the managing director's speech should be delivered personally, not on a public address system.

MR. FIDLER: Certainly. And it is easy to be personal where you have a limited number of employees. But where you are dealing with several thousands of employees, the public address system is the only way to get it over.

MR. BOND-WILLIAMS: We should be talking about talking to people. We are almost talking about talking at people. Jean-Paul Sartre in one of his plays makes the point that "hell is being with people who take no notice of you." Is not our problem this—that in order to communicate, the person who makes the approach must be prepared to listen; it is no good meeting anybody, no good attempting to meet anybody, if you are not prepared to listen, as listening is a prerequisite of talking.

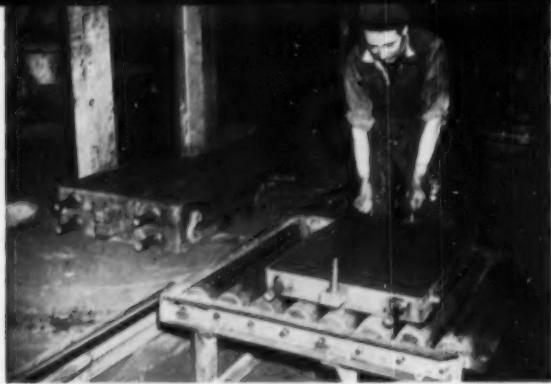
MR. GARNER: Where the problem of communication is one of distance between the top and the bottom level, the public address system widens rather than lessens the gap. It introduces a mechanical element of impersonality. If an organization is so large that the man at the top cannot meet the whole of his employees, then he must arrange that his responsibilities in the matter are delegated progressively down the scale.

MR. BASNETT: There is something of importance in using the lower levels of management. They are known in more familiar terms to the people on the shop floor.

MR. FIDLER: Tell me this. Could a worker not express himself far better on paper than he could if he came face to face with an executive?

MR. BASNETT: Seldom. That is the value of the representative system. It may be that he cannot express himself either by speech or by writing—not because of incapability but because he is over-awed by the circumstances. It is important that the representative system should be maintained.

The discussion was recorded on an Agaphone kindly supplied and serviced by M. and L. Haycraft Ltd., St. Stephen's House, London, S.W.1



1 First, the base of a mould is taken from a rotary moulding machine, and placed on a short roller conveyer. The upper half is put on top, and the complete mould is then rolled on to the main platform conveyer (left) and is carried forward to one of the two casting platforms

The present rate of production at the Birmingham works of John Wright & Co. Ltd. is the highest in the firm's history. Playing an important part in the steady rise in output is the No. 2 foundry, which is responsible for the manufacture of castings for the company's "New World" gas cookers. As shown here, the foundry has undergone a programme of mechanization, involving the use of several modern mechanical handling techniques. This has not only enabled it to speed up production, but has improved working conditions and simplified quality control.

'Business' Picture Story

Mechanical Handling in the Foundry



2 To enable the molten metal to be conveyed quickly and safely from the cupola to the casting platforms (one is seen on the extreme left), two bogies are suspended from a monorail conveyer, and are moved to and from the cupola alternately



3 After they have been poured, the castings cool while travelling slowly along the platform conveyer to the "vibrator." This mechanism, shown here, shakes the castings out of their moulds. They are then placed on the upper and lower pendulum trays of a monorail conveyer, which runs the full length of the foundry, serving both left and right-hand moulding tracks



4 This worker (15 per cent of the company's staff are coloured) is removing "runners and risers"—the small segments of cast-iron which remain attached to the castings after they have passed through the vibrating section



5 After the unwanted particles of cast-iron have been removed, the conveyor carries the castings forward to the fettling section. Here, they are taken from the pendulum trays and are inspected. If found satisfactory, they are then sorted into stillages



6 When filled, the stillages are removed from the foundry by electric truck. Here the truck is seen on the weighbridge, before setting out on its quarter-mile journey to the machine shop



7 The finished product. Greater mechanization has enabled the firm to raise output and also to market a high-quality cooker at a competitive price

ULTRASONICS

New Tools for Industry

By PETER SPOONER

RESEARCH into the comparatively young science of ultrasonics has already produced practical results. But descriptions of these developments are often so highly technical that the uninitiated are left with a hazy impression that the industrial use of ultrasonic techniques is limited to experimental and other specialized work.

This is not so. Apart from special installations, several standard production tools have made their commercial debut and are now simplifying industrial processes which concern a large number of manufacturers.

In this article the accent is on the more general applications. No attempt is made to explain in detail the principles on which they are based. Briefly, the science of ultrasonics involves the use of acoustic energy at frequencies above the range of human hearing—an extension, in effect, of the well-known principles of resonance, as illustrated by the shattering of glass by sound waves of a certain pitch. These ultrasonic vibrations are produced by a fairly simple device known as a transducer, which makes use of the fact that some materials expand and contract when placed in an intermittent magnetic field or subjected to an intermittent electric current.

The first practical application occurred during the 1914-18 war, when ultrasonic signalling devices were used for detecting enemy submarines. Since then, of course, the use of marine echo-sounding equipment has been established throughout the world.

Materials Testing

Such developments are of more than academic interest to manufacturers. During the past few years the same principles have been applied successfully in an increasingly important field of industry—the non-destructive testing of metals and other materials. The advantages of being able to examine the entire output of some products are obvious; and it has been found that ultrasonic flaw-detection techniques are often cheaper, safer, more convenient and more

accurate than either X-ray or gamma-ray scanning systems.

But this is by no means the only industrial application of ultrasonic principles. Others include:

- 1—Drilling and machining hard and brittle materials like ceramics, glass and tungsten-carbide.
- 2—Soldering (without flux or "scratching") aluminium and its alloys.
- 3—Cleaning intricate precision components which are either inaccessible to ordinary cleaning methods or might easily be damaged by them.

Before describing these applications in greater detail one fact must be emphasized. Although much has been achieved in a relatively short time, ultrasonic methods are still in an early stage of development; at present there are few large-scale applications from which working experience can be drawn. Nor is it reasonable to assume that the new techniques are invariably "better" than existing practices. One important consideration is cost. The practicability of large installations which require really high-power electronic generators has to be assessed by three criteria: (1) whether the expense is justified by the value of the product involved; (2) whether the use of ultrasonics achieves results which cannot be achieved by more conventional methods; and (3) whether the expense is offset by the speed with which the operations are carried out.

On the other hand, ultrasonic drilling—and other applications which

involve intense vibration over a very restricted area—require only small and relatively inexpensive generators. Here, both capital and running costs compare quite favourably with other methods, especially when the above-mentioned criteria are taken into account.

Non-destructive testing is one field in which considerable progress has been made. In this case low-power, high-frequency transducers are used, the ultrasonic energy being generated by applying an intermittent electric current to a piezo-electric crystal.

Applications are not restricted to metal products. One significant development is the system of testing aircraft and motor vehicle tyres on a production basis which has been installed at the Birmingham works of the Dunlop Rubber Company.

During testing, each tyre is revolved in a water bath, the characteristic impedances of water and rubber being practically the same. A continuous ultrasonic beam is transmitted by a crystal transducer in the well of the tyre: diverging at an angle of about 120 deg., it is picked up by six receiving crystals situated around the outer wall. Both the transmitting and receiving crystals are rocked on a pivot, thus allowing the whole tyre to be examined in a few revolutions.

The principle is that any internal discontinuity—imperfect bonding between rubber and fabric, for example—leads to the presence of an air film, which causes most of the ultrasonic

waves reaching it to be reflected. In practice, the apparatus can detect faults having an area as small as $\frac{1}{8}$ in. by $\frac{1}{8}$ in. An important point is that the system does not depend on absolute calibration; a specific area of the tyre is assumed to be "good" and the transmission of ultrasonic waves through all other parts is measured in relation to this "norm."

In applications where only one side of the material is accessible, a crystal transducer transmits short bursts of high-frequency waves, and the reflected pulses are picked up by a receiving crystal. This method is used for detecting minute flaws in metal castings, etc. Not only the presence of faults, but also their precise location, can be determined by moving a searching unit over the surface of the work, the reflections being amplified and transmitted on to the screen of a cathode-ray oscilloscope.

The same principle is used in measuring the thickness of materials in products where only one surface is readily accessible—pipes and boilers, for example.

One important advantage of ultrasonic flaw-detection apparatus over X-ray equipment is its portability, which allows heavy castings and assemblies to be tested on site, thus avoiding in many cases the cost of dismantling or transporting the products to a special testing area.

Consideration of the potentialities of ultrasonic machining has been stimulated recently by the introduction of two ultrasonic drills. In equipment



Soldering the ends of aluminium-foil condenser coils at the London works of Rotax Ltd. Before ultrasonic equipment was available, tin-foil—more expensive and less easily handled—had to be used

of this type high-power (but relatively low frequency) ultrasonic waves are generated by a magnetostrictive transducer. The principle is that the vibrations of the cutting tool "throw" an abrasive slurry against the surface of the workpiece. Since the action is based on a reciprocating movement, such apparatus can drill holes of any shape, producing, in effect, a "negative" impression of the cutting tool's face. Even curved holes can be cut, using as the tool a wire bent in an arc.

Among the other advantages are:

1—Cutting depends on the abrading action of the slurry, so wear on the tool is comparatively slight, even where exceptionally hard materials are being machined. Moreover,

new tools of any shape can be made cheaply and quickly from "soft" materials like brass and mild steel.

2—Heating of the workpiece is almost entirely localized to the cutting-point. Thus, there is little danger of distortion or any other change in the physical properties of the material.

3—Operating costs are quite low (a drill capable of machining holes up to $\frac{1}{2}$ in. across and $\frac{1}{2}$ in. deep consumes 175 w.h.) and no exceptional skill is required by the operator.

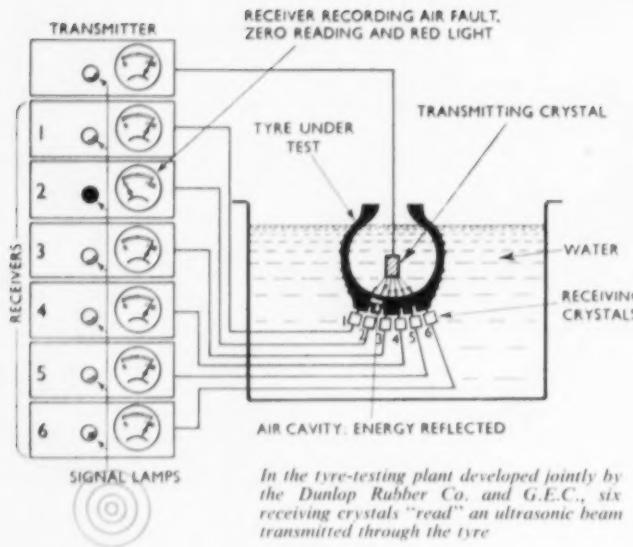
4—With suitable tools, the drills can also be used for sawing, shaping, grinding, polishing and other operations. Materials which can be machined efficiently include glass, germanium, diamond and titanium carbides.

Despite a slight scattering of the slurry, a high degree of accuracy is obtained. The actual figure depends on the size of the abrasive particles: using a 1,000-mesh abrasive for finishing-out, machining accuracies of about 0.0005 in. are possible. Speed depends on the size of the tool and the nature of the work. A $\frac{1}{8}$ in. square hollow tool will penetrate soda glass to a depth of 1 mm. in about 40 seconds; a similar cut in tungsten-carbide will take approximately 10 minutes.

Ultrasonic cleaning is another application which offers distinct advantages in some cases. The products—generally those of a delicate nature—are



The Mullard 50w. ultrasonic drill cuts intricately-shaped holes in exceptionally hard materials



In the tyre-testing plant developed jointly by the Dunlop Rubber Co. and G.E.C., six receiving crystals "read" an ultrasonic beam transmitted through the tyre

irradiated by an ultrasonic beam while immersed in cleaning fluid; the dirt, it seems, is literally shaken out.

As long ago as 1952, some mills were experimenting with the ultrasonic cleaning of wool and rayon waste. Another successful application concerns the removal of graphite stains from synthetic fabrics.

One British manufacturing company has recently installed a completely automatic ultrasonic degreasing and cleaning plant—the first, it is thought, in the world. Operating at a point on an assembly line where it is essential to remove lapping paste, oil and fine grit from tiny precision parts before they undergo the next process, the equipment is capable of handling more than one million parts a day. The two British companies who co-operated in its design and manufacture hope soon to supply a similar machine to the Swiss watchmaking industry.

When ultrasonic waves pass through liquids, many of the effects which occur are due to the phenomenon of cavitation—caused by the violent "collision" of bubbles of fluid as they change their size under rapidly varying pressures. This principle has been used successfully in the emulsification of liquids which do not mix under normal conditions.

Curiously enough, the same principle has made possible the development of ultrasonic soldering tools. In this case, the vibrations produce the

cavitation effect in the liquid solder, thus breaking up the oxide film which generally prevents aluminium and some alloys from being tinned satisfactorily.

Normally, a hand-held ultrasonic soldering iron is used, but small articles can be tinned very rapidly in a tinning bath which operates from the same power unit. This consists of a solder pot, $\frac{1}{2}$ in. in diameter and $\frac{1}{2}$ in. deep, to which ultrasonic vibrations are applied.

While such methods can be applied to easily-soldered metals like brass and copper, their real significance lies in the fact that they are extending the scope of aluminium and aluminium alloys in many industries.

Simpler and Cheaper

Ultrasonic soldering equipment was placed on the market about two years ago, and is already being employed by a number of firms; generally, its use is restricted to small (but nevertheless important) operations. A good example of the manner in which it simplifies and reduces the cost of some processes is provided by Rotax Ltd., London, N.W.10, manufacturers of aircraft electrical equipment.

In their case, ultrasonic soldering irons are used in the production of small spark-suppression condensers for magneto. After the ends of the paper and aluminium foil coils have been planished, zinc-tin solder is floated on to them ultrasonically.

Subsequently, pre-tinned spirals are soldered to the coils with orthodox electric soldering irons.

The working procedure is simple. Two irons are used alternately (a third is kept as a reserve), and to ensure that too much heat is not taken from the bits, the planished coils are pre-heated on an electric hot-plate. From here the operator transfers them, three at a time, into a hand vice which is simply laid on the bench in front of him while the solder is applied.

Before the ultrasonic method was available, it was impracticable to use aluminium foil for this purpose, since the delicate construction of the condensers precludes the use of scratch-brushes and corrosive fluxes. But tinfoil (more expensive) produced its own manufacturing problems. Unless the solder was "dropped" on to the planished ends with great care, the foil itself was liable to melt, thus ruining the component. For such a critical operation highly skilled workers were required—and even then the work was slow and there was a fairly large percentage of spoiled coils.

Handling a batch of 500 components occupied three experienced operators for the best part of a week. Using ultrasonic irons, one operator can deal with a similar batch in about two days. Moreover, the number of "spoils" is now negligible; before, it was often as high as 15-20 per cent.

Ultrasonic soldering methods can be applied to all metals which form refractory oxide layers. In the foundry, they can be used for making good blow-holes and other surface blemishes in alloy castings, and for modifying or repairing aluminium patterns.

This article has concentrated on applications which are likely to interest a large number of manufacturing firms. It must be recorded, however, that many other ultrasonic applications have been tried out experimentally and, in some cases, commercially. Examples are the ultrasonic treatment of paints to ensure that the pigments are dispersed as finely as possible, and the use of the cavitation phenomenon to secure a more uniform crystal structure when casting metal ingots. Even the maturing of whisky and wine has been "accelerated" by ultrasonic means—evidence, perhaps, that no field is sacrosanct to the advance of science.

While the industrial use of ultrasonics is still in an early stage, enough has been achieved already to show that many valuable new production tools will eventually emerge from the research laboratories.

Management at Work

TV TIME-SAVER

A UNIQUE inter-office television system has been installed by Smith Meters Ltd., at their Streatham, London, works.

An industrial television camera has been set up in the experimental shop, where the company's electrical and gas meters are constantly being inspected and improved. This is linked on a closed circuit with a receiver in the design engineer's office.

Since the office is in a separate building, some distance from the experimental shop, the designer is saved the time and trouble of visiting the shop throughout the day to answer queries relating to diagrams or mechanical parts.

Under the new system, an experimental worker simply places the diagram or part in front of the camera, contacts the designer on the internal telephone, and points to the detail which he wants to discuss.

FACTORY-TO-BUYER

TAYLOR, TAYLOR and HOBSON Ltd., optical and precision engineers, Leicester, have inaugurated a new factory-to-buyer delivery which they hope will save time and cut packing costs.

Recently an electronic measuring instrument was sent by van from Leicester to a Schweinfurt, Germany, ball-bearing factory. Driving the van was the company's senior technician, F. C. Butcher. His route was via Goole, Rotterdam, Arnhem, Cologne, Weisbaden, Frankfurt and Nuremberg.

Apart from the substantial reduction in packaging costs, the instrument was available for use almost as soon as it was delivered. Under the previous shipping arrangements, it would have been broken down into six crates and reassembled on the site.

ENCOURAGEMENT

WITH increasingly competitive conditions in world markets, brains and imagination will be needed to maintain British manufacturers' export sales—and much depends on the young men now entering industry. So said Henry Spurrier, managing director of Leyland Motors at the annual general

meeting of the company's engineering society.

But Mr. Spurrier was not simply echoing the pious observations made by businessmen in countless boardrooms and from countless platforms. Leylands do much to encourage their young employees to develop technical skills.

The society, formed nine years ago, is for the younger members of the company and aims to improve their know-



HENRY SPURRIER

For youth, an incentive

ledge of engineering and allied subjects. And Mr. Spurrier, its president, supplemented his general observations by announcing an additional incentive—a yearly award of £25 for the most outstanding member.

After the meeting, he himself played the part of questionmaster in a brains trust session. On the panel were the chief designer and two members of the research division.

NOT SO BRIGHT

ARE boys leaving secondary modern schools up to the standards required by industry? One organization which does not think so is the Enfield District Manufacturers' Association. Recently the association issued a forthright indictment of the educational standard of young people entering industry from the schools.

No punches were pulled at the

meeting at which this criticism was made. Members claimed that many of the ex-pupils were deficient in simple arithmetic and English, and could not absorb further technical education.

One firm quoted some revealing figures, based on a mixed intake of 41 apprentices. Of 11 grammar school boys, ten passed the examination at the end of the first year of the National Certificate Course. Nine out of nine technical school boys also passed, as did those from the central school and one from an "unreorganized" school. But of 18 boys from secondary modern schools, only nine passed.

The meeting was one held by representatives of the manufacturers' association and of the Enfield Joint Consultative Committee, on which the education committee and teachers are represented. One suggestion which arose from the discussion was that teachers should use part of the school holidays in making more intimate contact with local industry.

COMING CLEAN

A MAN who believes in washing his dirty laundry in public is Harold Seabrook, founder-director of Rael-Brook Ltd., London, S.E.15.

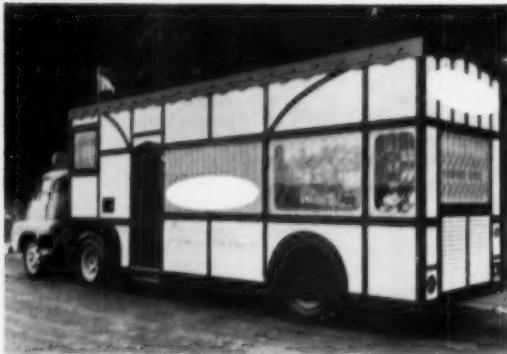
Rael-Brook market a new type of knitted nylon tricot shirt, which, they claim, can be washed in less than one minute. To prove this point at a recent publicity conference in London, Mr. Seabrook gave a personal demonstration. He took 45 seconds. Nine minutes later the shirt, dried, was being worn by a male mannequin.

As a result of this proof-of-the-pudding act, Mr. Seabrook expects to stimulate both home trade and export enquiries.

FAMILY VISITS

SOME of the employees of T. J. Smith and Nephew Ltd., Hull, asked if members of their families could visit the factory. The management saw the advantages—especially as the company employ a large number of girls straight from school—but decided that the usual type of "open day" would be too informal; it would be better, they thought, if the visitors saw the factory in full production and without "window dressing." So they evolved the more ambitious scheme which is now in operation.

Every Tuesday afternoon, a party of 25 visitors—all close relatives of the workers in one department—make a two-hour tour. They are greeted by



Tudor-style show van gives a new twist to a dollar export drive (see this page)

the works relations officer and introduced to the works director, who explains the scheme's objects and outlines the company's history and activities.

Their first call is at the department in which their relatives work. They meet the supervisors and are then taken individually to their relatives' workplaces. Beforehand, they are warned that production must continue as usual. The company have found that the disruption of routine work is, in fact, slight.

After about ten minutes the visitors are collected into a party again and commence a general tour of the factory. This is followed by tea in the canteen; executives of the company are present to answer questions.

When the scheme was introduced a short time ago, details were publicized through the wall newspaper system. The order in which the departments were to invite guests was decided by ballot, and employees were asked to enter the names and relationship of their visitors on a special form.

DOLLAR DRIVE

AN article in the December, 1954, issue of *BUSINESS* described the methods by which 29-year-old G. Kenneth Horner has built from scratch his company's prosperous export business. Mr. Horner's latest venture is to send a specially-designed display van on a 20,000-mile trip through Canada and the U.S.A.

Exterior of the 27ft. trailer is imitation Tudor; the interior might well be described as contemporary American. Mr. Horner chose the period exterior because he felt that an ultra-modern design might date before the vehicle had completed its useful life. From his experience in choosing packaging

designs for the North American market he knew that the Tudor style was popular there.

In six years Mr. Horner's personally-conducted export drive has earned more than one million dollars—one-third of the company's overseas trade. The van's trip, lasting at least six months, is expected to bring in a considerable amount of new business.

JOB ANALYSIS

JOB analysis is like the prose which people speak all their lives without knowing it. Every firm practises it in some form, but small businesses are inclined to think of it as a scientific technique which concerns only large organizations.

An example of a simple and effective job analysis application is supplied by the Derwent Valet Cleaners, Tasmania, Australia. Each job in the plant has been broken down into a dozen or so basic operations, to which are applied three acid tests:

- 1—Can it be eliminated or combined?
- 2—Can it be done more quickly?
- 3—Can it be done with less energy?

Results have been set down on paper in the form of "standard written procedures." Twenty-eight copies of these procedures are displayed prominently throughout the works.

Main application of the S.W.P. system is when a new employee is engaged. After a demonstration of the work, he is told to study the S.W.P. relating to his job, and is loaned the office copy to read at home. A few days later he is allowed to study the S.W.P. again for about 15 minutes, and is then expected to answer a number of set questions. Apart from its value in shortening the initial training period, this procedure

convinces the employee that he has joined an efficient business—in which efficient working is expected. Other advantages are:

(1) Standardization of the most efficient methods helps to keep experienced staff on the "straight and narrow path."

(2) Since they have immediate access to all S.W.P.s, members of the staff are more interchangeable than they were previously.

(3) The system is a basis for improvement. Workers are encouraged to suggest new methods. These are tried out and, if satisfactory, are incorporated in the appropriate S.W.P. But new ideas must not be tried out without the permission of the management.

(4) The mere fact of initially setting down every operation on paper brings to the management's attention the possibilities of making short-cuts and other improvements.

All S.W.P.s are reviewed periodically. Minor amendments are handwritten into the copies and explained to the whole of the department concerned. Where large amendments are made, the S.W.P. is re-issued.

Reviews in Brief

TESTED SENTENCES THAT SELL by Elmer Wheeler (Windmill Press) 10s. 6d. An American sales consultant who has tested thousands of word-combinations and selling points on customers at the point of sale, sets down in this short book his advice on how to compose sales talk and how, by the slight twist of a phrase, one can make all the difference between success and failure.

FAIRER SHARES by J. S. Lewis (Staples Press) 8s. 6d. Describes the working of the John Lewis Partnership, in its sharing of gain or profit, of knowledge and of executive power. Then proceeds to outline how the author considers that the principles of his own partnership could be applied on a wide scale in other businesses.

COST ACCOUNTING by C. B. Nickerson (McGraw-Hill) 56s. A textbook which combines instruction in general principles with numerous case histories of accounting problems. The author is professor of accounting at the Harvard Graduate School of Business Administration.

INDUSTRY AND THE GRADUATE, and A CAREER FOR THE GRADUATE IN INDUSTRY (Federation of British Industries) 2s. each. Two pamphlets discussing the prospects and scope for university graduates in industry, from the businessman's point of view and from the view of the young graduate seeking employment.

INDUSTRIAL CONFLICT, edited by Kornhauser, Dublin and Ross (McGraw-Hill) 56s. A symposium contributed by 39 authors, on American labour relations and union organization.

THE ATTACK ON BIG BUSINESS by J. D. Glover (Bailey Bros. & Swinfen) 48s. A scholarly analysis of views held about large-scale industry by some of its critics. The author is professor of business administration at Harvard.

From Pit Bottom to Board Room

IN 1915 John Clarke George, of Ballingry, Fifeshire, reached the school-leaving age of 14. There were three alternatives before him: he could have continued his education at a higher school; he could have taken a job in an office at, perhaps, 4s. a week; or he could have followed his father's footsteps to the bottom of the local mine. He chose to work with his father because his wages in the pit in those times of national emergency would be about 4s. a day. Perhaps that sounds a bit like grabbing at the big penny, but there was deeper thought than that behind the boy's decision. He reasoned that the quickest way to the top job in a colliery was to begin at the bottom. The soundness of that judgment is shown by the fact that ten years later he had qualified for a managerial post.

There is much more to the story. The boy worked his shifts during the day, and then, in the evenings, went to classes. He attended six classes in five days. To get to them he had to walk a mile and a half to the railway station, ride for another two miles, and of course later make the return journey. That was his weekly programme for seven years. And the programme took in a day's homework on Sundays.

Sometimes he would feel a bit tired in the late afternoon after his day's work in the pit and before he went to classes. His inclination was to have a nap, but his father thought it better to take the lad and his brothers for a game of golf on the nearby course. Mr. George now believes that that exercise gave him the health and energy which enabled him to continue on the strenuous path he had set out to follow.

He learned sufficient at night school about colliery management and engineering to help him obtain the first managerial job that offered. This was in a tiny pit with limited scope. He knew it was limited, but it was his first



J. C. GEORGE, C.B.E.
Chairman, Alloa Glass Work Company

command. Later he took other jobs in larger pits to gain more experience, and at the age of 26 he became manager of a big pit. He then felt he could afford to get married, and did.

During the next ten years Mr. George obtained successively more responsible posts, eventually becoming mining agent to the Alloa Coal Company, a family concern of the brothers Sir Harold and Mr. Alec M. Mitchell.

By LEONARD G. RULE

The Mitchell family had been connected with the company since 1835, and the brothers also had mining interests in Canada. Both men were brought up to the mining industry, and to become their mining agent was a prized post.

It was in 1937 that the Mitchell brothers became interested in the New Cumnock group of collieries which were then in financial difficulties. The future of this group looked black indeed, and the directors were pre-

Fifty-four-year-old John Clarke George, C.B.E., chairman of the Alloa Glass Work Company, started work in a coal mine at the age of 14. For seven years he attended evening classes five nights a week, and devoted Sunday to his homework. At 24 he became manager of his first pit, and at 36 mining agent to the Alloa Coal Company. One of his achievements was to turn the New Cumnock group of collieries from a money-losing into a profitable, highly mechanized and efficient concern. When he could see that coal would be nationalized, he turned his attention to the Alloa Glass Work Company, who since the war have trebled output, although the work force has increased by only one-sixth.

pared to sell out. On behalf of the Alloa Coal Company Mr. George went to New Cumnock to investigate the pits, from the engineering and geological standpoints. A good deal was already known, and a great deal more had been propounded as theory. For instance, there was the idea put forward about 1920 by Dr. J. B. Simpson, of the Geological Survey Department, that there were vast amounts of unexplored coal in the area. Much later, attempts were made to test this theory, but for various reasons nothing was found to support it.

Mr. George went over every foot of the workings, saw the difficulties which had precipitated the crisis in the affairs of the owning company, and considered the possibilities of the Simpson theory. He reported that: "With energy and intelligence applied, there is no doubt in my mind that the undertaking can be made very profitable without great capital outlay." This was a property which had made no



The collieries under Mr. George's management were pioneers in mechanization. The Joy loader shown here was the first introduced to Britain

profits for years. He believed in the Simpson theory, which was soon proved to be correct.

His employers took him at his word, a deal was made, and a new board of directors was formed. Shortly afterwards the board appointed Mr. George to be general manager of the group of pits. During the first month of his appointment the new company earned a substantial profit.

How could it happen that a property which had been losing money steadily for years should, almost overnight, turn to the other side of the ledger? Mr. George believed—and still believes—in budgeting and he believes that it is the function of management, by proper organization, to make it possible for men to get on with their work. He says that everything must be ready for the first shift to start work sharp to time on Monday mornings. There must be no delays of any kind due to managerial deficiencies. The coal-face must be prepared, tubs waiting, conveyor belts ready for work, and other mining machinery in good order.

Mr. George says that what happens on Monday mornings is vital because it sets the tone for the week. The Monday morning mood must always be that of a production drive. If, on the other hand, men have to stand about waiting through no fault of their own, a "don't care" attitude quickly spreads through the workplace and persists for the whole week.

Even more important from the production point of view, says Mr. George,

is the handling of men. He believes that the worst thing managements can do is to try to drive men. He is convinced that men will not be driven; that they resent the attempt to force them into work; and that even if production goes up for a short while through fear, the long-term effects of the policy are utterly bad. He prides himself that he always treats the men who work with him as reasonable individuals who will, given kindness, do the best they can for themselves and for their employers.

Mr. George makes one other claim in his relationships with those who work for him: it is that he has never had any of his officials come to him to ask for a rise. In assessing the salary (or wages) of a man or woman he always asks himself what he would have to pay to get a replacement from outside. Then he pays that amount. He claims that this policy has invariably given satisfaction.

Unpleasant Job

When he first took charge of the New Cumnock pits, he realized that many changes would have to be made both in the number of employees and in their dispositions. He faced the unpleasant duty of conveying this information himself. Not only did he say what changes would have to be made, but he also said why they must be. Inevitably there were some who disagreed with his judgments. Then he was firm: these things would have to be, he said, because he said so. Some men

were put out of work. So effective were the changes, however, that those who were sacked were taken back again for full-time work within a few months.

The results of this policy of handling labour became apparent during the recent war when there were a number of disputes at collieries nearby. None of the pits in the New Cumnock group was affected and production went smoothly ahead—in fact, the group captured some markets from other pits whose workers were in dispute with their employers.

The standard of production of the pits in the group has been rising ever since the group was taken over, and it is believed now to be among the highest in the country.

New Cumnock Collieries, Ltd., had other interests besides coal mining: they owned brickworks and a terracotta brick and tile works. Through these other interests Mr. George found another outlet for his energies. He had for long been concerned that Scotland had practically no sources of supply of clay bricks. There were plenty of bricks made in Scotland from colliery wastes such as shale, but these, he felt, were not good enough for the sort of houses Scotsmen ought to have. He managed three brickworks for his company until they were sold, and is at present equipping a clay brickworks with the most modern machinery. This will begin to operate early this year. His company is planning a second, large-scale clay brickworks for Perthshire. Mr. George is chairman of both these concerns.

Providing Work

Businessmen outside the spheres of coal-mining and brick making had begun to appreciate the qualities of John C. George. There were five slate quarries in Scotland which had fallen on hard times, and he was asked whether he could bring them back into production. Scottish slates by the way, are quite different from the Welsh variety, and many people—including Mr. George—believe that it is not Scottish nationalism which makes them prefer the small, thick, local variety on their roofs. These slates suit the countryside. Mr. George wanted to see them being used again, and he accepted the job that was offered to him. He does not claim to have effected any miracle, other than to put good management and good budgeting into the quarries. At any rate, they are still producing. They do not make much money, but they



One of the slate quarries which, by careful budgeting, have been kept in production

are paying their way and providing work for the skilled labour which would otherwise have been wasted.

Production continued to expand at the New Cumnock collieries during the war years, and mining machinery was installed wherever possible. Mr. George would be the last to claim that he was solely responsible for the progress made: he had first-class colleagues. But recognition of his driving force as general manager came in 1943 when he was given a place on the board.

With the ending of the war, a new problem became paramount in the coal industry. Nationalization had been discussed for many years, but the change of Government in 1945 made it inevitable. Perhaps Mr. George could have had an important post in the nationalized industry, but he preferred to turn his attention in another direction.

The Mitchell brothers had another family interest: the Alloa Glass Work Company, Ltd. Their grandfather and his brother, together with other shareholders of the Alloa Coal Company, had bought the Glass Work Company in 1873. It had been established in 1750, for the manufacture of bottles, and had had many ups and downs before the Mitchell family took over. More were to follow in the period between the two world wars. One particular source of disappointment was the firm's failure up to 1934, to capture any part of the trade in milk bottles.

During the second world war there was a huge demand for containers, and

the company worked at high pressure, but it was impossible to renew machinery or make structural alterations. Even so, plans were made for post-war reconstruction, including the purchase of new automatic machines. In 1945 Mr. George was invited to become a director of the Alloa Glass Work, and in 1947 he was appointed general manager.

Applying to the glass bottle industry the same personal techniques he had used in coal mining, Mr. George was able to win the confidence of his glass workers very quickly. He was content to leave the technical details to his staff, and concentrated on forward planning, budgeting and organizing the flow of work. A new shop was brought into production, and the capacity of the existing plant increased. In 1946-47 the output of the Glass Work was one-third higher than it had been in the previous year. In 1951 it was three times as high as in 1945, although the number of men employed in manufacture had increased by only one-sixth. They were almost lost among the great automatic machinery. Since 1951 yet another shop has been added. It will shortly be in production, and the capacity of the whole factory will then be about 600,000 bottles a day.

Scotland's Bottles

Mr. George is particularly proud of the rate of milk bottle production. Every milk bottle used in Scotland is now made at the Alloa Glass Work. This has been to some extent due to a publicity campaign inspired by Mr. George.

However, glass is not enough to absorb all his energies. He still keeps a footing in the world of coal through his chairmanship of the Joy-Sullivan Company of Greenock, which produces coal-cutting and loading machinery. And to give his mind fresh problems he is also chairman of Lucaro, Ltd., a subsidiary of W. H.

Colt (London) Ltd., who make a clay lath for use in building construction.

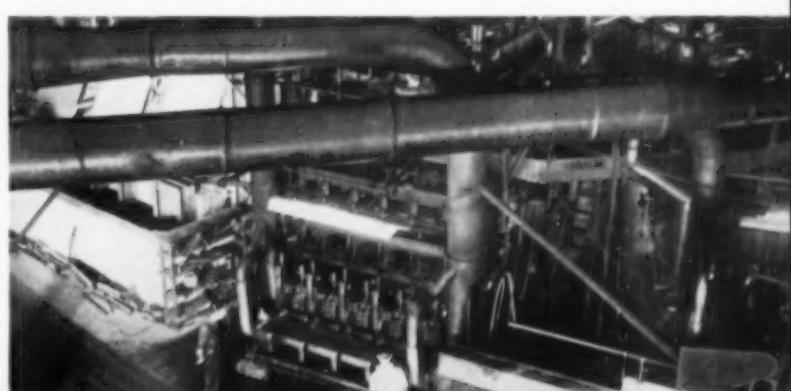
What are the qualities which have brought success to this boy from the pit? Mr. George claims only two: drive and kindness. The drive has enabled him to work hard in organizing production; the kindness has helped him to keep his staffs happy in their work. To the observer, the drive is a flaming force of energy which has apparently burned in Mr. George ever since he undertook his monumental programme of evening classes. But it is not a flame that scorches others; rather does it tend to permeate them with a fiery zeal to get the best results.

"Kindness" is a modest claim from a man who has had so little conflict with individual workers and with trade unions. It would be nearer the truth to say that he has done everything possible to improve the lot of those who work for him.

An important sign of intelligence is a tendency to look forward—to plan for the future. The stress which Mr. George places on the need for organizing production, his success in achieving this, and his insistence on budgeting, suggest that he is highly intelligent. But above all, he is a plain speaker who is never afraid of the truth and means exactly what he says.

Mr. George holds the C.B.E. "for political and public services," which include his membership of Alloa Town Council and Clackmannan County Council, of which he is "landward" member. But his special pride and joy is the Old People's Welfare Committee, which he started.

He is now beginning to take his business life more quietly, turning more often to a game of golf and the occasional fishing outing. Maybe he will find time to get his golf handicap down from eight to the four at which it stood when he was in his twenties, but as he is still only 54 the odds are that another product will come along to set the flame within him at full blast again.



The "great automatic machinery" at the Alloa Glass Works. It produces every milk bottle used in Scotland



The potential customer can "use" the Cowley level fitted to this display stand

This article, the second in the series, describes how a firm of scientific instrument makers were approached by an inventor, and, after thoroughly testing his invention, adopted it for development. By redesigning it for mass production and making a comprehensive market survey, they were successful in introducing this new product—the Cowley level—to one of the world's oldest established trades.

HOW TO DEVELOP NEW MARKETS—2

A New Product in an Old Trade

By JOHN A. ASH

HOW do manufacturers ascertain and marketing a new invention? What steps do they take when confronted with the latest "brainchild" of an inventor? Hilger and Watts, scientific instrument makers, have been approached by many inventors in their 98 years' history. Some have been "cranks" and others men with sound ideas. But all have been given a hearing. Each invention is closely examined by a team of skilled engineers, and then classified as either a possibility for further investigation or a reject. The latter category embraces the majority, but occasionally a really sound idea is presented. Such was the case when an Australian, Keith Cowley, confronted them with his automatic level for the building and civil engineering trades.

He invented this level in the course

of war-time defence of the Australian mainland against the threat of Japanese invasion, its purpose being to replace the cumbersome and expensive telescopic levels used in nearly all construction work. Like the telescopic level, it is mounted on a tripod and resembles in size and shape a small cine-camera. One of its primary advantages is that it can be used by unskilled labour. The principle is simple—the level sights itself, as it were, by means of tiny mirrors, one of which is mounted at right angles on a pendulum. All that has to be done is for one man to move a bar on a measuring rod up and down until his partner, operating the level, sees an unbroken line reflected in the sights.

Mr. Cowley had been marketing his level successfully in Australia, but he did not have the facilities for mass-production, which the invention seemed

to warrant. He therefore decided to try and interest a manufacturer in quantity production, and he came to England, as the opportunities for development here were greater than in Australia. In April, 1951, he approached Hilger and Watts.

Following their usual policy, they accepted the level for close examination—both of its technical capabilities and its commercial prospects. After nearly a year's investigations, they decided to adopt it.

As the Cowley level was an entirely different instrument from Hilger and Watts' usual products, it could not be sold through their regular marketing channels. Therefore in March, 1952, they decided to set up a new department in the works to deal solely with this new instrument. Frederick Hamill, an experienced engineer and businessman—both were necessary qualifications for the job—was appointed head of the department.

The first big problem with which he was faced was the re-designing of the level for quantity production. His drawing office staff worked with this aim for several months, and by the end

of that period had so altered the design that the main body, incorporating some of the internal supports and strengthening ribs, could be die-cast. This represented a considerable saving in expensive machining, and made possible the manufacture of the level in large quantities, using unskilled labour to assemble the parts.

While the level was reaching this prototype stage, Mr. Hamill was making a careful market survey in the London area. It was not necessary for him to go outside the capital city, for the building trade uses similar instruments throughout the country.

The new level had to win recognition as a cheap and equally efficient alterna-

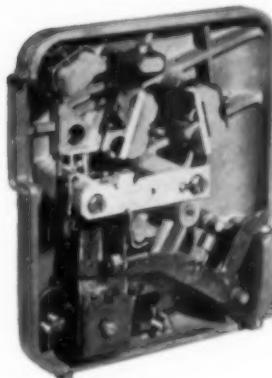
immediately, but some were apprehensive as to the selling power of a new instrument in one of the world's oldest established trades. To clear up their apprehension, Mr. Hamill and his staff visited these sceptical merchants with an invitation to accompany them on a short selling tour of their local area. Whether it was the merits of the level, or the art of salesmanship, can only be guessed, but these visits seldom failed to convince the merchants that the level should be added to their selling lines. Hilger and Watts were to be distributors only, all enquiries and orders being passed on to local stockists to deal with.

Meanwhile, several thousand die castings of the body of the level had been produced under sub-contract. The remaining components were manufactured within the company, and complete levels were being assembled at the rate of 40 a week. After three months the rate was increased to 175 a week, and this has been maintained.

A press reception was held for the introduction of the level and a country-wide advertising campaign was started. This consisted of advertising in the



The interior of the level, before (above) and after redesigning for quantity production. The body of the production job is die-cast



building and civil engineering trade magazines and counter displays (including working models). Additionally, talks were given at meetings of the Federation of Master Builders.

A two-part guarantee is given with each level, one part to be retained by the buyer, and the other, complete with name and address, to be sent back to Hilger and Watts in the usual way. By comparing the returns of these forms—a comprehensive record of all users—with the list of builders' merchants in the British Isles, it can at once be seen where the level is selling

well and where a little more pushing is needed.

Where it is clear that an agent cannot cope with his area, another stockist is appointed in the area to even out the load. Where, say, three out of five builders in an area have purchased the level, sales promotion is slackened off, but where only one in five has bought it, the selling campaign is intensified. In this way an overall picture of marketing progress can be obtained at a glance.

Once the level had been sold in most areas, an after-sales questionnaire was circulated to all users. It sought information on their occupation, when they purchased the instrument, the uses to which it had been put, the frequency of use, results of use, any criticisms or suggestions, etc.

In some cases, the occupation of the user brought to light trades which had been overlooked in the initial survey of markets. The uses also varied widely. In most cases, the level had been used with most satisfactory results, and the criticisms were constructional. A common criticism was that the tripod could have been a little sturdier, and so all subsequent models were despatched with a re-designed tripod. By studying the answers on the questionnaires, it was possible to keep abreast of any new requirements of the level in the building trade.

The overseas market was a little easier to cope with due to the different retailing conditions. For example, in the Scandinavian countries all scientific instruments are sold through opticians, and not builders' merchants. Hilger and Watts already had a well-established market abroad for their other products, and in most cases it was just a matter of adding another instrument to their range. The agents on the continent and in all parts of the world were allowed to handle the selling of the product in their own ways, according to local environment and circumstances. Their success is evident from the fact that over 3,000 of the company's levels were sold abroad in 1954.

The case of the Cowley level suggests that it can often be well worth a manufacturer's time and trouble to investigate an invention which is brought to him. Patience in assessing its qualities, in re-designing and in market research can pay dividends. Also, and perhaps even more important, the success of Hilger and Watts in developing and marketing the Cowley level, shows that there are facilities available in Britain to aid the man of inventive ideas who has not the technical and business resources to develop his ideas himself.

tive to the telescopic level. An Australian-manufactured level was used as a demonstration model, and many of London's leading builders were asked whether it had sufficient applications and could be used frequently enough to justify its cost. In nine cases out of ten, the answer was that the trade had long been awaiting the development of a level which could be entrusted to unskilled labour. A reasonable price had been quoted, and suggestions were invited. By the end of his London tour, it became quite evident to Mr. Hamill that there was a large enough market to justify a country-wide selling campaign.

Armed with this knowledge, he started a search for agents. Leading builders' merchants in every town were asked to retail the level. The request was gilded with very fair trade discount rates for quantity buying and free delivery costs. The majority accepted

EMPLOYEE SHAREHOLDING 2

Case History 4

BIRFIELD INDUSTRIES LTD., the light engineering group, introduced an employee shareholding scheme in 1952. A feature of this scheme is that it was designed to overcome the unfortunate snag that when shares are issued to employees at below the market price, the Inland Revenue take the view that they must assess the employees for income tax on the difference between issue price and market price on the date of issue.

What Birfield Industries have done is, therefore, to issue Preference Shares at par. There is thus no initial capital gain for the employees. Under the provisions of the scheme, these shares later become convertible, under certain conditions, into Ordinary shares without further payment by the employee. And as the law stands, there can be no assessment of tax on the capital gain derived at the time of conversion.

Initially only those employees who had 15 years of loyal service with the company were allowed to participate in the Birfield scheme. A total of 16,896 shares were issued to 450 of the company's 4,500 employees. Only five per cent of the employees invited to participate did not do so. The number of shares per year of service that a participating employee was allowed to take up varied from one to five, depending on his position in the firm. There have been issues of employees' Preference shares each year since 1952, and if all those entitled under a recent issue, take up their shares, about 1,900 employees will, between them, have taken up about 78,000 shares.

Now let us see how conversion to Ordinary shares takes place. After an issue of Preference shares has been made, a notional reserve is set aside

How to Tackle the Tax Problem

By the EDITOR

out of profits each year, until a credit has been built up equal to the difference between the agreed conversion price and the original issue price. The Employees' Preference shares are issued at £1. Their conversion price is equal to the average Wednesday price of the Ordinary stock of the company during the twelve months preceding the date of issue. Suppose, for example, that this is £5. Then the Preference shares will not be convertible until a notional credit of £4 has been built up. And in order to determine this notional credit, a form of profit-sharing without any actual cash payments is used.

The original issue of Employees' Preference shares was worth £16,896. The nominal value of Ordinary stock in the company at that time was £265,000. These two capitals were added together and divided into the net retained profits attributable to this capital, after deducting all taxes and net interest and dividend charges. Thus a figure of net retained profit per share was arrived at. This was the conversion credit for the year. In the first two years of operating the scheme, notional credits of £3 1s. 10d. per share were built up against the original issue of Preference shares. Their required conversion credit is £5 4s. 7d., so it is expected that they will become eligible for conversion after the accounts for 1955 have been published. And then they become eligible, retro-

spectively, for the scrip issues made to Ordinary Stockholders since they were originally issued. Also during the period prior to conversion, Employees' Preference shares receive a dividend of ten per cent.

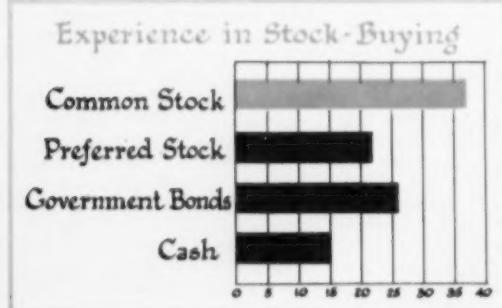
Case History 5

The Standard Oil Co. of Ohio introduced an employee shareholding scheme in 1952. This is in some respects an improvement on (but basically similar to) the scheme introduced by Sears, Roebuck & Co., the United States mail order house, in 1916. Under the Sears, Roebuck scheme, employees retiring from the company during the period 1946-48 realised an average profit of \$20,117 on an average investment of \$2,134 in the company's Savings and Profit-sharing Pension Fund. In one case, an employee who had made an investment of \$7,900 made a profit of \$208,000. This type of scheme, therefore, can offer great prospects of reward to employees if their company is successful. But it is proposed to describe the Standard Oil scheme rather than that of Sears, Roebuck, as the former is more up-to-date.

Full-time employees of Standard Oil of Ohio may join the scheme if they have more than two years of service and are already contributing to the company's retirement plan, which is quite separate. They must agree to allot either three or six per cent of their basic wage or salary—that is, excluding overtime, bonuses and commissions—to an account in the National City Bank of Cleveland, who act as trustees for the scheme.

These allotments are deducted from their pay, and an allottee may change from the three per cent to the six per cent rate at will, subject to a maximum allotment of \$60 a month.

Every quarter, the company make a contribution to the bank account of each participating employee, and this contribution is proportional to the amount allotted during the past quarter by the employee. The pro-



Given free choice, this is how the average Standard Oil employee has decided to invest the money accruing to his account

An article on page 73 of the December issue of "Business" put forward some of the chief reasons why there has recently been a growth in the number of employee shareholding schemes. Case histories were presented of the schemes run by Tootal Ltd., Joseph Lucas Ltd. and Hoover Ltd. Three further case histories are presented here, and a concluding article in this series next month will present other case histories and draw some general conclusions.

portion depends on the rate of profit earned by the company during the preceding four quarters.

It is worth noting that instead of assessing the rate of profit on the nominal capital of the company, it is assessed on the net assets employed in the business, including borrowed capital.

Profits and interest on borrowed capital are added together and divided by net shareholders' assets plus borrowed capital. If the result is less than six per cent, then the company make no contribution to the allotment accounts of employees. If the rate of profit is between six and nine per cent, the company contribute a sum equal to one-third of each employee's allotments during the previous quarter. If the rate of profit is between nine and twelve per cent, the company's contribution is one-half, and for rates of profit of twelve per cent or more, the contribution is two-thirds.

The company have over 11,200 employees, of whom about two-thirds are eligible to participate in the scheme. Of these, more than 80 per cent actually have allotments made from their pay. About two-thirds of the participants allot the maximum of six per cent of their wages. The cost of the company's contributions is not exorbitant. To quote one recent example, when the company made a contribution equal to one-half of the employee allotments, the total company contribution was less than ten per cent of what it paid out in dividends to stockholders. The company's contributions are, of course, an allowable expense to the company, for tax purposes.

Employees' Choice

Money put in the National City Bank by the employees and the company is invested according to the wishes of each individual employee. He may leave the money in his account in cash, or instruct the bank to buy Government Savings Bonds or Standard Oil Common or Preferred Stock. In the first two years of the scheme's operation, allotments made by employees totaled \$393,000, and the company's contributions amounted to \$1,127,000. On the average, employees chose to put 37 per cent of their funds into Standard Oil Common Stock, 22

per cent into Preferred Stock, 26 per cent into Government Bonds, and leave 15 per cent in cash. There is, however, a rule under which no employee may put more than two-thirds of the funds in his account into Standard Oil Common Stock.

Expenses of buying and selling stock are debited to each employee's account, but the expenses of maintaining the bank accounts are borne by the company. The voting rights of the stock in employee accounts belong to the trustees in whose name the stock is registered. Dividends and interest are paid into the accounts, not in cash to employees, and the money may be invested along with the employees' allotments and the company's contributions.

If He Withdraws

If the employee decides to withdraw from the scheme before he has been making allotments for five years, he can take with him only the amount of his own allotments plus interest and dividends. He cannot withdraw the company's contributions. Moreover, he cannot rejoin the scheme for a further 12 months. Thus withdrawals are discouraged.

If an employee dies, his account is liquidated and the total, including the company's contributions, is paid out to his beneficiaries. If an employee leaves the service of the company, his account is liquidated, and he can take with him the company's contributions only if he has been making allotments for more than five years. Employees do not have income tax deducted from the company's contribution or from dividends and interest, at the time when these monies are paid into their accounts, but the tax is deducted later when the money is withdrawn. The advantage of this, from the employee's point of view, is that if the money is left there until retirement, or at least for a long period of years, the United States income tax authorities charge only the "capital gains" rate of tax, which is much lower than the normal rate of income tax.

Moreover, if the money is withdrawn during retirement, when the employee is unlikely to be paying a high rate of tax, he effectively transfers some of his tax liabilities from years of

peak earnings to later years of lower earnings, and thus pays less tax on the whole.

Case History 6

In May this year Imperial Chemical Industries Ltd., who have 106,000 employees and 250,000 stockholders, decided to introduce an employee shareholding scheme. Under this scheme, in any year in which the Ordinary dividend exceeds five per cent, employees may be allotted, via a trust fund, a share of the profits based on their own annual remuneration. This bonus will be at the same rate as the percentage by which the Ordinary dividend exceeds five per cent. Thus, if the dividend were in some future year to be ten per cent, each employee would have allotted to his account with the trustees five per cent of his remuneration. This sum would, of course, be taxed in the hands of the employee, but would be allowable, for tax purposes, to the company.

The net bonus after tax will be paid into employees' accounts with the trustees, who will invest it in Ordinary shares of the company, issued at a price which is equal to the average stock exchange price during the previous 20 business days.

When an employee's account reaches a value exceeding that of 25 £1 units of Ordinary stock, at market price, the trustees are to issue 25 shares to the employee, without restriction. The stock issued will be new units provided by the company, and not shares bought on the Stock Exchange. Thus, there will be no stamp duty and no brokerage involved. But if an employee later wants to sell his shares he will have to pay brokerage.

The qualifying period for participating in the scheme is 2½ years of service, and also those participating must be of adult age. Thus about 75,000 employees are eligible to participate. It is expected that in the first year, assuming a dividend of 7½ per cent, about £500,000 of new Ordinary stock will be issued to the trustees, and this may be compared with more than £141 million of Ordinary stock already in issue to the public.

The trustees to the scheme are appointed by the company, but include both staff and works payroll employees.

MEN OF VISION

He Took Industry to the Highlands

WHAT is the difference between a man with a bee in his bonnet and a man of vision? Perhaps the answer is that the man of vision is to some extent successful in achieving his vision; the other man is unsuccessful and the bee remains in his bonnet. There have been lots of Scotsmen of both sorts, and in fact the people of the Highlands are often visionaries. But rarely do they dream of doing something practical about the depopulation of that magnificent part of Britain. The young people (and some of the older ones) leave for the towns, or for other countries. Many British governments have shed public tears about the lack of industries among the mountains, and about the hard lot of the crofters who scratch a living from the thin soil on which they were born. Relatively little is done about it.

To do something about this situation needs either a bee in the bonnet, or a man of vision. That is where 53-year-old John McConachie Rollo, O.B.E., comes in. He has the vision and he does the work.

His vision springs from his love of the Highlands—he loves them so well that he gave up a good job in London



John McC. Rollo, O.B.E.
His formula: "Take the machines to the men"

to get back to them—and his love of the people who live there. Born in a manse at Springburn, John Rollo was apprenticed to engineering at the North British locomotive works. He also took the degree of B.Sc. After working at several other engineering plants, Mr. Rollo decided to strike out on his own. He took the plunge in 1930. With the financial help of friends, he set up the Dempster-Moore machine

tool factory at Bonnybridge in Stirlingshire. It was, and is, a small factory, but from it came Rollo's vision: take other small industries to the Highlands.

In 1941 he opened the first such factory at Easdale, in Argyll, for the manufacture of small machine parts. It ran steadily—if slowly—and produces now ploughs and parts for tractors assembled in Ross-shire. Six years later Mr. Rollo opened a factory at Balado, on the borders of Perth and Kinross, starting it with two members of the local aero club, who were vital to the club but could find no work nearby.

With help from the county council of Ross and Cromarty Mr. Rollo put up another factory for a dozen workers at Inverasdale on remote Loch Ewe two years ago, and capped that by refitting a disused foundry at Wick just a year ago. All this activity comes from the visionary's formula: "Take the machines to the men."

One of the main difficulties which Mr. Rollo has had to overcome is that of transporting raw material to the factories and collecting the finished products. It has been done by using a lorry which makes the round trip of them all, a journey of almost a thousand miles, twice a month. The products of the factories are selling well, even in overseas markets.

There was much else for Mr. Rollo to do. He has a croft on Easdale which he farms at week-ends. He realised that if only there was a tractor small enough and cheap enough much of the back-break and the heartache might be removed from crofting. First he built a pedal tractor. Hard though the pedalling was, it was easier than the ancient foot ploughs still to be found in the Highlands. His next model had a miniature cycle engine for propulsion. This, however, was too limited in scope.

Then he designed a new tractor round a three horse power engine. This was small enough to be cheap, but powerful enough to do the work.

The machine was shown at the Scottish Industries Exhibition in Glasgow last September. Mr. Rollo can proudly say that it is "designed for a crofter by a crofter," and he can add that parts of the machine which may revolutionize agriculture in the Highlands are made in his Highland factories.

Not only does the tractor draw a single-breasted plough, but it can also draw a trailer for conveying crops, fertilizers and peat. The trailer will even act as a bus on the rough Highland roads. It will carry half a dozen



"Designed by a crofter for a crofter": the tractor which Mr. Rollo produced specifically for Highland agriculture

people at six miles an hour—twice the speed that most people have been able to achieve so far on their feet. That should make for a great increase in social life among the crofters' families.

But the most important thing of all is that, according to Mr. Rollo, a crofter who has such a tractor ought to be able to make a good living from eighteen to twenty acres. How does

Mr. Rollo know about this? He has proved it on his own croft by the most careful cost accounting.

Mr. Rollo is vice-chairman of the Highland Fund for the economic and social development of the Highlands and of rural Scotland. He also plays quite a part in running the Highlands Voluntary Development Association. Yes, he really loves the Highlands.

sufficiently to employ a full-time representative.

By the end of 1952, orders had increased to such an extent that production could no longer keep pace, and business was being lost. Larger premises were clearly necessary, and Mr. Danielsen began a search. At first, he had intended to convert an existing factory to suit his own requirements, but a brief investigation soon convinced him that it would be almost as cheap to build an entirely new one. A site was therefore acquired at Droitwich Spa. This small town in Worcestershire was particularly suitable, as the local authority was anxious to encourage light industry, "taking the waters" having declined in popularity.

After the site had been purchased the new factory—steel-framed with brick-built walls—was completed in just over six months, in spite of delays resulting from the discovery of an old Roman wall beneath the foundations.

Before transferring his employees into the new plant, Mr. Danielsen decided on a bold experiment in management-worker relations. A model layout of the works floor was made, and each operator was invited to select the position which he considered would be most suitable for his machine. After the various suggestions had been noted, Mr. Danielsen and Mr. Humphreys, who was now works manager, evolved a final design for the whole of the factory floor. Not only did this novel scheme help to maintain a cordial atmosphere during the difficult transition period, but it also ensured that the workers, having taken the responsibility for the selection of their own positions, would do their utmost to make the new layout a success.

Occupation of the new factory meant, of course, that far greater output levels could be reached. Extra workers were taken on, and the company embarked on a large-scale advertising programme to publicise their products and make firms more conscious of the investment casting system. Exhibitions were staged in several large industrial cities, including Glasgow, Manchester and London.

Along with the expansion of the company's advertising programme has been an increase in the welfare facilities offered to the staff and workers. In addition to pensions for the office staff and bonuses for the workers, an officially-registered building society has been inaugurated, and six houses have already been built on a site conveniently near the factory.

Meeting in a P.O.W. Camp Led to Post-War Success

TEAM work is, of course, a vital asset in every business, whether large or small, and the post-war success of Deritend Precision Castings Ltd. is one example of this—as Robert W. N. Danielsen, founder and joint managing director of the firm would be the first to admit.

In 1905, his father, Colonel J. W. Danielsen, formed the Deritend Stamping Company of Birmingham, and Mr. Danielsen showed a similar inclination when he served an apprenticeship in marine engineering. When war broke out he joined the Signals Corps (he had previously served for some years in the Territorial Army) and was later captured in 1940, near Dunkirk.

While a prisoner, he met another engineer, George Robinson, and a close friendship developed between them. Later, when moved to another camp, he also met John Humphreys, who had completed an engineering apprenticeship with a large motor company just before his call-up. Both these men were later to play an important part in the formation of Deritend Precision Castings Ltd.

When the war ended, Mr. Danielsen decided to join his father's company. A chance reunion with Mr. Robinson, however, resulted in his becoming very interested in a method of investment casting—also known as the "lost wax" process—which was then undergoing research by a foundry near Slough.

Further investigation soon convinced Mr. Danielsen that the process could be commercially profitable. So it was arranged that the Deritend Stamping Company should provide sufficient capital to start a subsidiary organization.

The first workshop was set up in a disused building which had formerly been a fodder store for canal boat horses—a romantic but hardly aesthetic site for a new foundry! Mr. Danielsen then wrote to Mr. Robinson and



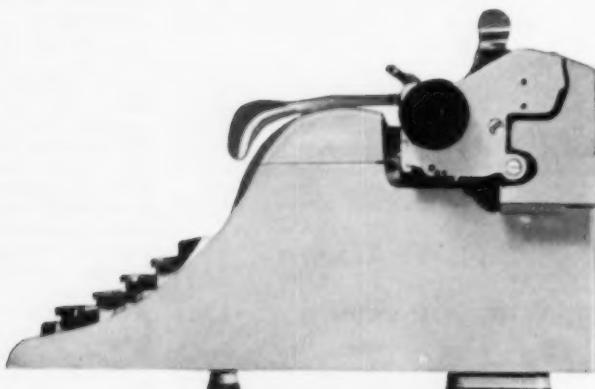
Robert W. N. Danielsen

A business sprang from confidence in old friends and a new process

Mr. Humphreys, inviting them to join him in his new venture. In both cases his offer was accepted, and Mr. Humphreys was immediately despatched to Slough on a short training course.

In November, 1948, the three men made the first casting themselves. The experiment was a success, and Mr. Danielsen decided to take a chance—to enrol a small band of workers and produce a number of high-grade castings which could be used in an all-out attempt to win prospective customers.

Mindful of the discipline and team spirit instilled by Service life, Mr. Danielsen decided to employ mainly ex-Servicemen during the first vital years of his company's existence. After these men had been quickly trained (by the managing director and his two colleagues) and a number of high-quality castings had been produced, the biggest obstacle of all had to be faced—the selling of an entirely new idea. At first, Mr. Danielsen contented himself with approaching customers of the Deritend Stamping Company, but gradually a full list of "prospects" was compiled. The principals themselves visited the various firms until business had expanded



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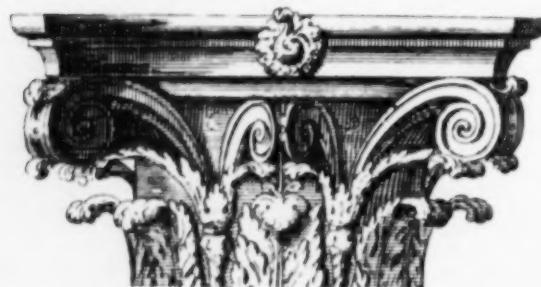


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Lt.-Col. L. F. URWICK,
O.B.E., M.C.

SINCE Mr. Cooke regards consultants with some knowledge about management as pirates ("bold buccaneers" was his phrase) and your editorial policy is to deal only in the raw material of management knowledge, viz. "cases," who am I to argue?

May I point out, however, that the difference between us is not whether management can be learned or not, but how it can best be learned. Mr. Cooke and, presumably, your good selves believe that it can best be learned by "experience," i.e. by the ancient method of apprenticeship. The limitations of this method are:—

- (i) That the "cases" and information with which the individual can make personal contact are extraordinarily limited.
- (ii) That their impact on his mind is haphazard, dictated by the accident of circumstances, not by the requirements of teaching.
- (iii) That the journeymen who teach the apprentice may or may not have any aptitude for teaching and are usually more concerned with using the apprentice to increase their own earnings than with enlarging his learning.

I happen to believe that while "experience" is of course essential, it needs to be supplemented by some formal study.

As to the content of that formal study, modern management is, like modern medicine, an art resting on a wide range of underlying disciplines and best practised in the scientific temper and spirit. The disciplines include law, economics, history, statistics, psychology, sociology, biology, engineering, metallurgy and the range of techniques to which Mr. Cooke refers somewhat slightly. But more

URWICK versus OXFORD

In our November issue (page 65) we quoted from a speech by Colin A. Cooke, senior bursar of Magdalen College, Oxford, in which he said: "The whole of the present-day urge to study and improve management by research on how to manage is a huge mistake." Existing management teaching, he maintained, was in fact confined to subjects which had an indirect bearing on management. "There is no such science as the science of management," he declared. Here, Mr. Cooke's challenge is taken up by Lt.-Col. L. F. Urwick, O.B.E., M.C., chairman of Urwick Orr and Partners Ltd., management consultants, and a pioneer in British management training.

important than any of the underlying disciplines is the attitude of mind, the integrity, the respect for fact with which the student learns to approach his task of trying to arrange the working lives of other people.

The trouble is not that the would-be manager has so little to learn—"such principles are so obvious and so elastic in practice, that they require little teaching" as you say—but so much. The problem is a problem of selection and pedagogic method. And that is a problem which is primarily the responsibility of those whose profession is teaching. It is a problem which this country is not facing.

Leading businessmen who have learned what they know by the old method of apprenticeship may perhaps be forgiven for the conviction that it is the best and only way. Our older universities have no such excuse. Their attitude to the teaching of management is dictated fundamentally by their attitude to business as a career. That, to put it bluntly, is mediaeval. They still cherish the delusion that being in business is incompatible with intellectual and moral integrity. They do not regard it as an

occupation suitable for really "educated" individuals. The persistence of this snobbery means that they are deliberately neglecting the contribution of learning to the activity on which the existence of the country depends.

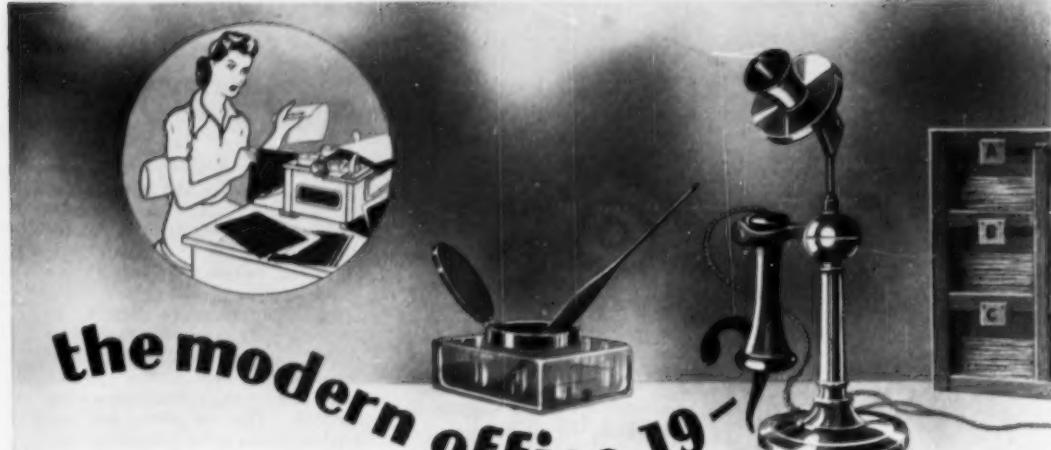
The consequences are obvious. In the United States in 1951 there were 380,000 students at university level "majoring" in management subjects. In this country there were at most a few hundreds. Thus we have to send productivity teams to the United States in order to try to find out how to make a mechanized economy work.

That is the central issue. Wilfully we live in a mechanized economy. Only by making it work can we survive. And to make it work we have got to "know how," to understand it, socially as well as mechanically. It is useless philosophizing about it, still less trying to approach the problem politically. No man ever persuaded a stalled automobile to start again by kissing its radiator or kicking its differential.

That is the problem with which the study and teaching of management are concerned. In asserting that there is "no such science as the science of management" Mr. Cooke is merely saying that where human beings are concerned an exact science, in the sense that mathematics is an exact science, is impossible. Yet Oxford teaches and grants degrees in Political Science, Medical Science, Military Science, Economics and so on. Are not these branches of knowledge concerned fundamentally with human beings and their behaviour?

May I, in conclusion, direct Mr. Cooke's attention to the very large literature which has developed around, for instance, the Hawthorne Experiments at the Western Electric Company. To say that any school or institution teaching is in fact, only teaching stuff that has an indirect bearing on management, such as methods of organizing an office or planning production, is to ignore elements in the subject altogether.

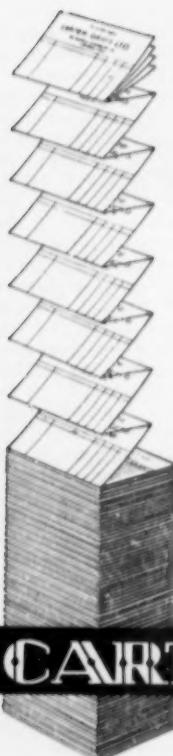
Every practical art has its technologies. But such a sentence is equivalent to denying that there is such a subject as medicine because the writer has only encountered the literature of radiology and pharmacology.



the modern office. 19'.

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This home-made device, embodying a cycle pedal spur wheel, has halved production time

MANY smaller firms are reluctant to call in industrial consultants because they assume that only large businesses are in a position to embark upon costly schemes of reorganization. The experience of Copperad Ltd. has shown that the scope for scientific planning is not limited by the size of the factory, and that under the guidance of specialists a substantial increase in production can sometimes be obtained with existing equipment.

Copperad are manufacturers of a wide range of industrial heating equipment for operation on steam and hot water. About 250 workers are employed. The company have been established for over 20 years, during which time they have played a large part in the development of unit heaters, convector heaters and methods of forced draught and radiant heating for use in industrial and commercial premises. They have also developed an autoburner for firing boilers with low grade solid fuel. The sales force covers the whole of the British Isles and the company have offices in London, Birmingham and Edinburgh, as well as agents overseas.

In 1946, the factory was transferred to its present site at Colnbrook, Bucks. The floor space has since been doubled and output has gone up by more than four times. Three years ago, rising production costs made it desirable to investigate the possibility of improving the utilization of both materials and labour. Despite the comparatively small size of the firm, the management

decided to investigate the possibilities of employing industrial consultants. A consulting firm were therefore invited to make a survey, to see whether a suitable scheme could be recommended.

The consultants reported that they could effect a considerable reduction in manufacturing costs, and that they could be employed on a part-time basis. An agreement was therefore concluded which covered production control, work study, and general works documentation and procedure. Subject to this section of the scheme proving economical, the obvious follow-on of budgetary control and standard

by the consultants was only in the region of £1,000.

It was further stipulated that the consultants should train members of Copperad's existing staff to fill any new posts arising from their recommendations. Several employees were given special training, among them being the present time study engineer, who was formerly the press shop foreman.

Production Control

The first step was to minimize interruptions and waiting time by introducing a detailed procedure for production and stock control. A small production control department was therefore set up. This is in charge of work loading and also controls materials. The department is responsible for having all components and sub-assemblies in stock or manufactured by the date of assembly, which is approximately seven days before despatch. This set-up has relieved foremen and charge-hands of much paper work, allowing them to devote their full attention to the practical problems of production.

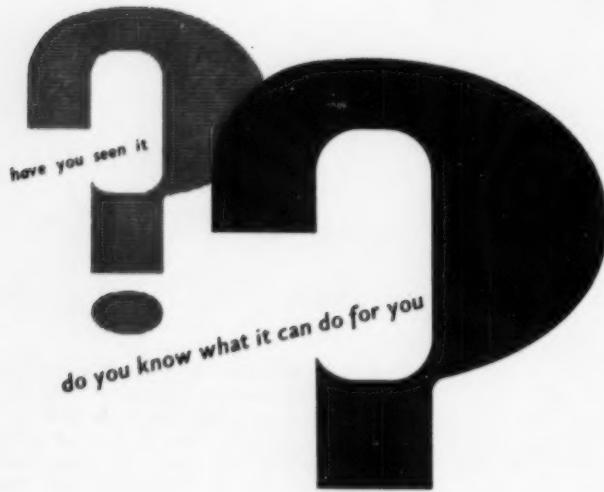
All forms used in the factory are produced rapidly from a master hectograph carbon on a line extraction machine.

When a product is scheduled for manufacture, it appears in the shop

By A. G. THOMSON

costing would then be considered as a separate item.

Although the whole programme was carried out by the consultants on a part-time basis, it was arranged that one of their representatives would always be in full-time attendance at the factory during the critical period when any section of the scheme was being put into operation. It was also a condition of the contract that the consultants were to produce the best results possible from existing plant and equipment. In fact, the entire capital expenditure on new plant recommended



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loading programme for a particular week or day. The job books for each day's programme are sent to the control desk and are filed by job number in the appropriate trays. The jobs are then issued to the shop in bulk. The identity card, material requisition card and movement card are given to the foreman of the department in which the first operation takes place. For the first and each subsequent operation, the operator selected to do the job exchanges the movement card for the appropriate job card.

On receipt of the movement card, after each operation, the control clerk immediately re-routes this card to the foreman of the section in which the next operation occurs, as a pre-loading instruction. Job times are clocked-in at the control desk. Operation times are summarized on daily work sheets which record what each man has done, how much he has earned, extra allowances granted for reasons beyond his control, and waiting time. These daily work sheets are incorporated in a weekly control sheet, showing actual cost against standard, and analysing the costs of the various excess allowances.

Work Study

Once the production cycle was flowing smoothly, the consultants were in a position to prepare a new incentive bonus scheme based on standard times established by work study. Owing to the time and cost involved, it was impracticable to study the whole factory as a single unit. It was therefore decided to deal with the nine production departments in turn, starting with those in which the worst bottlenecks occurred. This phase of the reconstruction began in March 1952 and was completed about May 1953, most of the work again being done by the company's own staff.

Manufacturing operations were studied closely to find out whether any improvements could be effected by minor alterations, such as simple jigs, alterations to fixtures, adjustments to tables, or improved facilities for loading and unloading work. This commonsense approach to time and method study allowed substantial savings to be effected in a number of instances by modifications costing shillings rather than pounds.

One item, for example, is produced in seven different sizes, each having its own size of notch, and the tooling costs involved would normally be large. By rigging up on a standard

4in. x 4in. notching tool a simple combination of stops, it is now possible to produce all sizes without any duplication of tools.

Another component is a welded tubular connection for a battery, which is screwed at one end and profiled at the other. The former method of production was to profile the part with a milling cutter and then hold it in a chuck while the other end was screwed. The present practice is to make the parts in pairs, threading both ends of a tubular section and mounting this on a home-made device embodying a bicycle pedal spur wheel, rotating a cam which advances and retards the work piece through an oxy-acetylene cut-off flame, so tracing the profile on each half. In this way, the expensive milling operation has been entirely eliminated and the components are produced in less than half the time.

Convector batteries used to be assembled more or less by hand, and careful measurements were required. A simple jig was designed and the two operatives engaged on this work were allowed to choose between the old and new methods. Within a week the old method had been discarded, one girl had voluntarily left the job, and the other was assembling twice as many batteries as the two operatives together did before.

In many press tools, the work was held by tongs because runs were too short to warrant automatic loading. Guards could not entirely eliminate the possible risk of pinched fingers or of tools being smashed because tongs were not removed in time. These hazards have been practically abolished by using an inclined press and sliding

the parts down a chute attached to the tool. After operation, gravity or the next incoming component ejects the finished part through the back of the press. This enables positive guards to be used. It costs about 30s. to put a slide on a press tool, but the production cost of a component has been brought down in some cases by as much as 60 per cent.

Another time-saving innovation is a jig used in a multi-spindle drilling machine for drilling four holes in a piece of piping. Formerly the work was held in a V-clamp which had to be very solid, and great difficulty was experienced in removing the pieces after drilling. Now the top of the jig is pivoted so that it can be raised or lowered, and a latch drops into position and holds the jig firmly closed.

Trouble was constantly experienced in making-up certain combinations of wiring for fan convectors. Cutting the wires to length was more or less a matter of guesswork and depended very much on the operator's know-how. This operation has been simplified by making up a wooden board with pins on which the various terminals are mounted. On the board are lines of the appropriate colours and lengths, corresponding with the wires needed. When a job is altered, a board corresponding to the new arrangement is prepared.

The production of "diffuser air straighteners" for unit heaters involves the assembly of four sheet metal sections. Formerly the sections were clamped together in pairs and spot-welded, using ordinary hand clamps, the two pairs then being welded together. Now the four sections are

By modifying this standard tube bender, output was more than doubled



Stages in the Reorganization

held firmly in position by keys at the top and bottom, each key consisting simply of a piece of metal having four slots and a handle, and the whole unit is welded in a single operation. Besides speeding production, the new method ensures that all surfaces are level, which is of great importance.

The aggregate effect of this simple but effective "gadgetry," of which many other examples could be given, has been very great.

Incentive Payments

The next step was the introduction of incentive payments. Before a bonus scheme was installed in any department, a meeting was called of all the workers concerned, together with the shop stewards and other trade union representatives. Projected changes of method were explained and discussed, and a works specification sheet setting out the conditions of the scheme was prepared for each department, as a permanent record. Further meetings were held at frequent intervals, if requested, until the scheme was operating to the satisfaction of all concerned.

Having dealt with the production departments, the consultants extended the incentive scheme to cover indirect departments such as stores, packing, transport and maintenance, the earnings of these indirect workers being related to the overall activity of the shop.

Budgetary Control and Standard Costing

In view of the considerable savings arising from production control and the incentive bonus schemes, it was decided to proceed with the second stage, using the information resulting from the control procedure and bonus payments to install a system of budgetary control and standard costing. The objectives were threefold:

- 1—To determine the cost of each product.
- 2—To enable all costs and expenditure to be controlled.
- 3—To provide a medium for "forward planning."

Product costs are obtained by evaluating the material and work specifications made available by material control, production control and work study. The master operation layout for each component is extended to give material, labour and overhead costs. By summarizing the costs of com-

ponents, the total costs of sub-assemblies are obtained; these in turn are summarized and costs of assembly, painting etc., are added to give the total standard product cost.

To achieve the second objective—cost control—it was necessary to set up budgets for every item of expenditure, both in the production departments and on the administrative side, against which actual expenditure could be measured. For certain items, such budgets must obviously be flexible, so that as the volume of production changes the expenditure allowances will be changed in relation to the increase or decrease in work activity.

Costs are controlled by measuring the actual against the allowed expenditure, the figures being presented to the departmental heads and foremen within ten days of the end of the period, in order that action may be promptly taken.

Forward planning is done through a comprehensive budget, of which the expenditure budgets used for cost control form a part. This budget sets out the probable results of the policy which the company intends to pursue for the next financial period. It covers the anticipated sales in volume and in value, the costs of production of this volume, and the forward cash accruals and requirements of this policy.

Just as detailed expenditure can be compared with budgeted expenditure, it is now possible to compare the whole business picture at any time with the forward plan. Any deviation from the plan becomes immediately apparent and action can be taken at once to correct it. Action is taken as a result

of meetings at three levels—board of directors, management and shop floor. The overall picture is watched and controlled at board level, while more detailed control, especially in respect of expenditure and production results, is exercised by a budget committee acting through the normal lines of command.

The reporting system installed is designed to build up information in the form of a pyramid. At the apex is the summary return, which allows top management to view the progress of the business in broad perspective against the forward plan.

The sales volume is controlled against the forward plan, forecast and actual sales and their total costs being shown in the summary return, the profit margin expressed as a return on the capital invested. Sales are analysed by product, the forecast and actual sales values being shown for the current period and also cumulatively. The returns are compared with those of previous periods. Sales are also analysed by area, the area managers having the dual responsibility of keeping sales up to the agreed target and keeping expenses within the agreed limit.

The value of orders received for all products is summarized, forecast and actual orders again being shown for the current period and cumulatively. A return of orders on hand but not yet executed links up sales with orders.

The profit and loss account gives the standard profit when manufacturing at standard cost, which is converted to the actual profit by adding or deducting all

Continued on page 144

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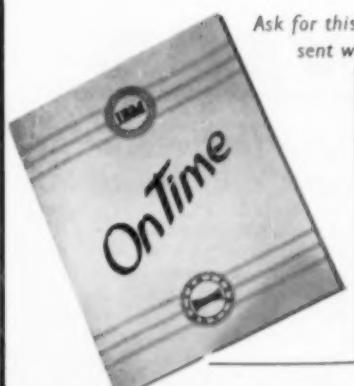
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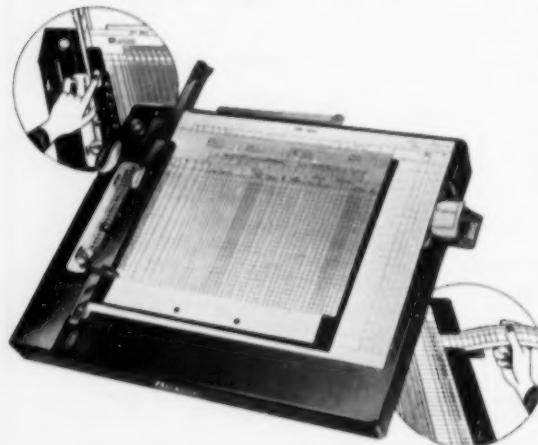
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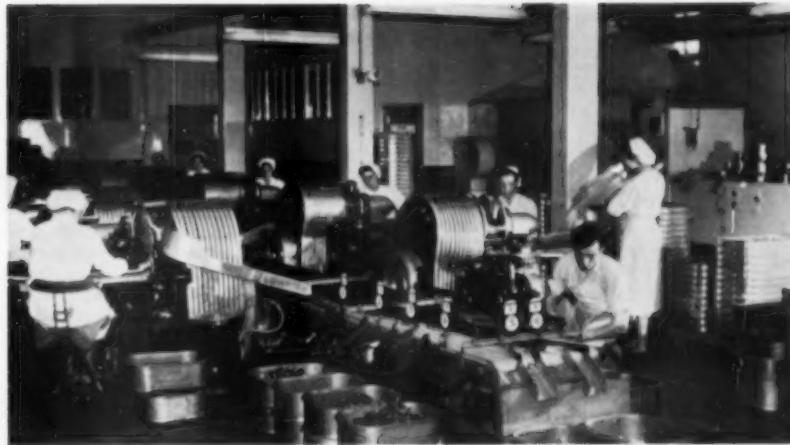
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COMPANY _____

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B



Feeding sweets into wrapping machines at the Pascall works. A key point in the firm's personnel policy has been to relieve the monotony of repetitive work such as this

Good Supervision Can Reduce Labour Turnover

By LEWIS KONRAD

Employing nearly 1,100 women on repetitive jobs, James Pascall Ltd., in common with other manufacturers, used to experience difficulties in maintaining a stable labour force. By extending supervisor training and encouraging a "help yourself" attitude among the workers, they have achieved a more contented working population, thus substantially reducing labour turnover

KEEPING employees contented at their work, when they are merely cogs in a machine doing repetitive jobs for eight hours a day, is a longstanding problem for large-scale manufacturers. James Pascall Ltd., of Mitcham, Surrey, the sugar confectionery manufacturers, have tackled this problem with considerable success. Nearly 1,100 of their 1,800 employees are women with ages ranging from 15 to over 50. The majority of these women are employed in the wrapping, packing or hand-dipping departments, although some do light duties in the manufacturing rooms.

Most of the work is of a repetitive nature, consisting largely of machine-

minding and, as in most industries where married women are employed, the labour turnover is high. To combat this and to lessen the burden of routine work, the company have taken steps during the past few years to improve the welfare of the workers.

The actual working conditions at Mitcham are very good. Departments in the factory are all of modern layout. Each is large and well-planned, with tiled floors and white-painted walls. A modern air-conditioning plant keeps the factory well ventilated, and light is supplied by fluorescent strips. Where necessary, supplementary lighting is provided for machine operators. A conveyor belt system is used between

each manufacturing stage, from the preparation of the raw materials, all the way through the shaping, setting, wrapping and packing departments, and finally to the despatch department.

When new employees are engaged, a great deal of attention is paid to age and dexterity, so as to ensure that they are placed in jobs to which they are most suited. Also, each new entrant is given a thorough medical examination and the works doctor suggests which jobs would *not* be suitable. All applicants are individually interviewed for the assessment of their capabilities. They are shown the work for which they have been selected and given a chance to meet the supervisor and talk



Thorough "on-the-job" training of supervisors is supplemented by lectures upon human relations and other relevant aspects of management

about the job. If they do not like the look of a job, or think they would prefer to do something different, an attempt is made to place them in a job which will suit them. (This cannot, of course, be made a hard and fast practice, as there are not always vacancies in every department.)

Preferences

It has been found that some women prefer to work in a team; some do not like to work with machines; others prefer a cold working atmosphere to a warm one. The personnel department always endeavours to cater for these personal preferences, for it is felt that by doing so the company is more likely to maintain a stable labour force.

Young girls who have just left school are usually selected for work in the dipping rooms, as they tend to learn and work more quickly than older women. On the other hand, older women are preferred in the wrapping department, as this work involves using machines. There is no age criterion for new recruits to the packing rooms, which also provide opportunity for those who prefer teamwork. A smaller department for enrobing (or chocolate covering) employs younger girls, as little skill or manual dexterity is needed.

All these jobs, no matter how simple, need a certain amount of initial training. In the wrapping department, new entrants work with a skilled wrapping-machine operator for three weeks, after which they are left to work on their own, but under constant super-

vision. In the dipping rooms, where a considerable measure of skill is needed, new girls receive 13 weeks' training. They are first taught how to shape the sweets, and then how to attain working speed. By putting all the trainees together, a competitive form of incentive to raise output is created.

Occasionally, a girl who has been working at a job for some time decides that she wants to change. It may be that the noise of the machines gives her a headache. More probably, she has had a "tiff" with a fellow-worker, or even the supervisor. Through the head of her department, she makes an appointment to see the personnel manager. If a talk to the girl or girls concerned provides a remedy, then the girl either goes back to her job with her differences settled, or, if necessary, is transferred to another department. Usually, differences on the shop floor can be cleared up on the spot by the personnel manager or his staff, and transfers are few.

Change by Rota

In a department where several girls are working on slightly varied jobs, they make out a rota by which they can change jobs during the day, thus relieving the monotony. The supervisors are urged to encourage this "help yourself" attitude of the girls, and give as much assistance and advice as possible on the preparation of these internal "switch" rotas.

Every day, four "music-while-you-work" programmes are broadcast over

the factory loudspeaker system and tea breaks are provided in the afternoon and morning.

When girls are employed on a "sitting-down" job, they are provided with industrial chairs; for "standing" jobs, stools are supplied. Every Monday, all employees are given clean white overalls and each girl is given a white head-square. To facilitate changing in and out of working clothes, each girl has a separate locker and is supplied with a personal key. As cleanliness is such an important factor in the handling of food-stuffs, numerous wash-basins are provided.

The facilities for the women workers play an important part in retaining the labour force, but it is perhaps even more important that the supervisors should be patient and understanding, and able to settle differences on the shop floor rather than refer all trouble to the departmental heads. On this type of work there is a natural tendency, towards the end of a shift, for tempers to begin to fray, and workers can be easily upset by a thoughtless word from the foreman. The management are well aware of this, and recognise the importance of the supervisors, who need to be given every facility for training in human relations. A bad supervisor can stimulate trouble in the factory, but a well-trained one can keep the peace and iron out difficulties as they arise.

Training Plan

A great deal has been done to give supervisors as much training as possible. This is mostly on-the-job training, in which the potential foreman is given the opportunity to study the practical work of his foreman, and have frequent discussions with the head of his department, whose task it is to assess whether or not he has the qualities of leadership. Particular attention is paid to training in the field of human relations, and talks are also given on other relevant aspects of management, such as production control and the responsibilities of the factory supervisor.

Since paying greater attention to the placing of new employees and improving the training facilities for their supervisors, James Pascall Ltd., have secured a more stable and contented working population. This is borne out by the fact that there has been a substantial drop in labour turnover. The management hope that, by continuing their policy, an even lower figure will be obtained.

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Translucent ledger sheets save time and stationery costs. The original statement (top) can be retained for further use

This Photo-copier Cuts Office Printing Costs

FIIONS Ltd. are one of the largest manufacturers of fertilizer in the world, with eight sales offices and 20 factories in the British Isles alone. To help speed communications between one section of the company and another, a vast quantity of forms, documents and circulars are despatched each day from the head office at Felixstowe to branches throughout the country. In addition, there are the usual routine forms and memos passing between the various administrative departments, and a large number of statements for despatch to customers.

To help cope with the preparation of this work, the firm have always maintained a printing department equipped with offset printing and duplicating machines. Until recently, however, the problem of how to produce cheaply and at high speed, those

forms and instruction sheets of which only six, eight or (perhaps) ten copies were needed, had not been satisfactorily resolved. Obviously, it was impracticable to use offset printing for such short runs, and even the usual stencil duplicating system did not provide a really economic method of

By WILLIAM JAY

reproduction. The only alternative—to retype each item two or three times using carbons and copy sheets—was objected to on four main counts:

objected to on four main counts:—
1—It was too slow.
2—Constant checking and re-checking of carbon copies was necessary to ensure that no transcription errors had been made and that amendments to the original had not been

Modern photo-copying methods can be used to fulfil many office printing requirements. This article describes how Fisons Ltd. of Felixstowe are now using a copying process which speeds the distribution of essential information, saves typing time and reduces the danger of transcription errors.

omitted from copies—particularly important on the many forms including figures (statistical reports, schedules, etc.).

- 3—The presentability of the carbon copies, i.e., the likelihood of figures being hard to read, or even quite illegible on the weaker carbons.
- 4—A new typing operation was necessary if further copies were required at a later date.

Two or three years ago, therefore, it was decided to examine the possibility of installing a continuous photo-copying machine, similar to the type already used in their drawing office, but on a smaller scale and capable of greater output rate. Investigations soon revealed that no such process was yet on the market but that many other firms were experiencing the same need.

The work done by a committee set up under the auspices of the British Institute of Management brought this need to the notice of a number of photo-copying equipment manufacturers and, as a result, there is now available in this country photo-copying machinery specifically designed for high-speed reproduction of small office items (up to double foolscap size) rather than the large-scale blue-prints of the drawing office. Fisons, naturally, were one of the first firms to install

this equipment, which consists of a table-type machine capable of producing positive copies direct from original translucent single-sided documents *without* the use of a negative and at a speed of over 300 copies per hour. If the original is opaque or printed on both sides, a small automatic developing machine must also be used to prepare the translucent positive. One of the chief advantages of the process is that no liquid touches the prints. Because of this, copies leave the machine dry and flat, each succeeding copy being equal in definition to the original. These copies cost about 1d. each.

Before being inserted in the machine, the master copy is prepared by the typist in exactly the same way as an ordinary sheet of typescript except, of course, that the paper is translucent and that a photo-process ribbon is used instead of the normal red-and-black. Alternatively, if the machines are also required for routine letter-typing, a yellow carbon sheet can be used with an ordinary ribbon. This sheet is backed on to the translucent paper as it is fed into the platen, the yellow carbon side being placed uppermost (i.e., actually resting against the back of the translucent sheet to give the image maximum density).

Operation of the machine is quite simple—so simple, in fact, that any junior member of the office staff can use it as and when required. First, the translucent sheet is passed through a lower in-feed, backed by sensitized paper, which is yellow on one (sensitized) side, and white on the other. When this second sheet emerges from the machine, the yellow surface has been "bleached" off the paper, leaving an invisible impression of the typed matter. This sheet is then passed through a second in-feed, the bleaching process is completed, and the invisible writing is clearly reproduced. This procedure is repeated until the number

of copies necessary has been obtained. The master is then filed and is available for printing additional copies if required. Total time spent in the machine by each sheet is about 25 seconds.

To help the typing staff decide which method of reproduction should be used for each piece of work sent in for typing, a special instruction chart has been prepared which shows at a glance the type of original to be used for any particular item. These instructions are based on the most economical and efficient method of producing the number of copies required, and are as follows:

No. of copies	Method of Reproduction
1-10	Photo copying (unless carbon will suffice).
10-1,000	Offset printing (paper plates).
1,000-2,500	Stencil duplicating.
Over 2,500	Offset printing (plastic or metal plates).
For short-run work	Special quick colour-change stencil duplicating.
two-colour work	

As already stated, Fisons have found that the photo-copying process can be used economically for a wide variety of forms, documents and diagrams, the deciding factor in each case being the number of copies required. When, for instance, a department wishes to circulate a memo to eight or nine other departments the text is typed direct on to a sheet of translucent paper, ready for insertion in the photo-copier.

The advantages of the process are also fully exploited by Fisons accounting department. A particular application is sales ledgers, which are maintained on translucent sheets.

Each account is recorded on sheets of very strong translucent paper, which have already been printed with the necessary standardized headings, customers' name and address and column markings by an offset litho machine. The accounting machines are equipped with photo-process ribbons so that, as far as the operators are concerned, posting is precisely the same as with

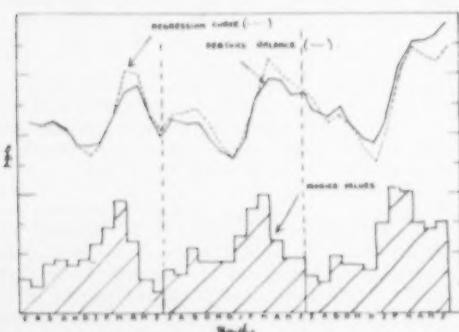
the ordinary type of ledger sheet (credit balances being denoted by CR.). When a statement is required by the customer, or is due for despatch at the end of the accounting period, the accounts clerk has only to take the appropriate ledger sheets from the file and send them to the photocopying room. Here single copies are run off and despatched to the customer, while the original sheets are returned to the posting trays for further use.

Fisons have also found the process useful in reproducing articles or short items from papers and trade magazines, or from official reports. An example of the machine's adaptability in this field was demonstrated recently when one of the head office departments wished to distribute copies of a Government circular which had unfortunately been rather badly mutilated during the duplication process. By making a translucent copy, the printing department were able to reproduce a number of copies which were far clearer than the original. Similarly, when the only available copy of an important report was found to be the original photographic negative, and copies were required quickly, this was run through the photo-copier, and the result was a "white-on-blue" reproduction which was perfectly readable.

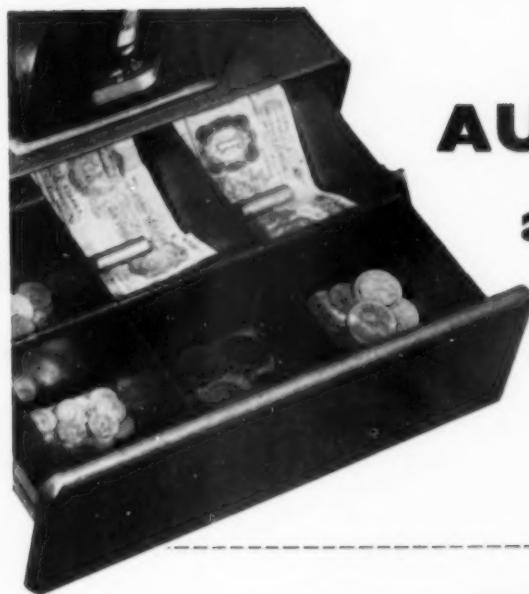
Handwriting, too

It should, perhaps, be emphasized that the work does not *have* to be typed before it can be inserted into the machine. Handwritten items will reproduce just as well. Fisons, in fact, now prepare quite a large number of statistical reports in this way, especially when the subject matter consists of large figures, statistical calculations, chemical formulae, or where diagrams are called for. Translucent paper is readily available in all departments at head office for this purpose. This application of the procedure means a tremendous saving in time lost during typing and saves any possibility of errors in transcription.

Nor is the use of the process limited to the company's head office only. More and more branches are now sending in their statistical reports—sales analyses, cost statements, etc.—on translucent paper, either in manuscript or type, so that copies can be run off on the photo-copier and distributed to the administrative departments concerned.



Fisons reproduce all types of material on their photo-copier. A diagram such as this can be copied and distributed in a few minutes



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The sanction office at William Whiteleys. The clerk on the left is checking an account in the visible record index, while those on the right listen carefully as departmental assistants read out the names and addresses of customers

How Sanction-by-Phone Speeds Credit Control

By JOHN PARKYN

Control of credit accounts is a problem which faces many retailers—department stores in particular. William Whiteley Ltd., the Bayswater store, are now using a system of credit sanction and dissection which, as this article describes, has helped to cut costs and to improve customer service.

WILLIAM WHITELEY LTD., the well-known department store, are now using a system of credit control which, in six months, has cut the average time spent on obtaining credit sanction by more than 85 per cent, and which has also substantially reduced the staff engaged on giving sanction and dissecting sales figures. As the number of accounts held by the store is increasing steadily every month, the saving in time, trouble and expenditure is obviously quite considerable.

The fundamentals of the credit account system have not, however, been changed. When customers wish to open a credit account, they are still required to provide trade and bank

references, and are still invited to see the credit manager before their name is passed to the accounts department for entry on a ledger sheet. The changes which have been made are in the methods of credit sanction and dissection—in other words, the system which enables the sales assistant to ensure that the customer does, in fact, hold an account with the store, and the dissection department to analyse the sale into "department" and "assistant" turnover figures.

To speed-up the actual credit sanctioning process, Whiteleys' management realized that extensive alterations would be required—first, in the method of communication between the sales floor and the sanction office, and

second, in the system of checking used by the sanction clerks.

Taking the communication system first, the company found themselves faced with several alternatives. The simplest of these was for the sales assistant herself to take the bill to the sanction office, and then to return with it to the customer. This method is still used in a number of smaller firms, but is quite unsuitable in a large store, where many of the sales departments are a considerable distance from the sanction office.

Use of the internal telephone system was also rejected, on the grounds that it would lead to congestion of the lines and—more important—because it did not provide for any method of marking



By placing the bill in an aperture at the base of the phone (left), the sales assistant enables the sanction clerk to mark it with "proof of sanction." The mark is made by a small printing unit in the interior of the phone. The assistant then places the bill in the cash register "printing chute" (right) and presses the total-key. The amount is simultaneously printed on the bill and added to the assistant's sales total

the bill with "proof of sanction"—a protective measure which is necessary for both the store and the sales staff.

The third alternative—a carrier system—had been used by the store for a number of years but, although it is a reliable method, the management considered that it was too slow to cope with the increasing quantity of work caused by post-war prosperity.

Quick Service

Finally, after careful consideration, it was decided to install the system which, as mentioned earlier, has achieved substantial reductions in both time and expenditure. The basis of the system is a network of 30 special "sanction" telephones which are sited at strategic points in the various departments. All these phones are connected direct to one or other of four control panels in the sanction office. The call, it will be noted, does not have to pass through the store's switchboard, and there is no need for the assistant to dial or ask for a particular extension. Thus the company have overcome one of the major problems connected with obtaining credit sanction—the time taken up while the assistant gets in touch with the sanction clerk.

As soon as the sales assistant lifts the receiver, a small green bulb lights up on one of the control panels in the sanction office and a buzzer sounds. The clerk lifts the receiver—thereby cutting off the light and stopping the buzzer—and listens as the assistant

reads out the customer's name and address, and the total value of items purchased.

To enable the clerk to provide immediate printed proof of the bill's validity, a small aperture is fitted in each of the 30 departmental sanction phones, near the base of the casing. The sales assistant slides the bill into this and presses down a small lever on the left hand side of the base. This lights up a red bulb on the control panel, indicating that the bill is in position and awaiting sanction. The clerk then presses a knob on the panel which operates a small printing unit in the interior of the departmental phone. This mechanism prints the date and official sanction mark on the bill, and the sales assistant is able to remove the bill from the aperture. The whole operation normally takes from 20 to 30 seconds only. In addition to providing the customer with quick service, it helps to keep down the number of sales staff required, as assistants are no longer kept waiting for sanction and are therefore free to serve more customers.

Reorganization

The sanction office itself has undergone considerable reorganization to ensure high-speed service. Here, the main problem was to enable the sanction clerks to check the customer's name against their records as rapidly as possible. The most straightforward method would have been to accommodate the accounts department and



sanction office in one room, thus enabling the sanction clerks to consult the customer's ledger sheet. This system has the advantage of complete reliability, as the clerk has all the required information before her.

On the other hand, there was the difficulty of accommodating the ledger sheets in a position where they could be quickly and easily reached. It was decided, therefore, to place the sanction office and the accounts department in adjacent rooms, so that the sanction clerks could consult a ledger sheet in all cases of doubt, or where an exceptionally large sum was involved. This did not, of course, preclude the necessity of maintaining a separate record file for immediate reference, and so it was decided to use a visible record system, with a small card bearing name, address, bank, etc., for each credit customer. The cards are filed alphabetically in flat "pull-out" trays, the name and address on each being immediately visible.

A simple colour-coding system is also used to aid the sanction clerks in their work. When a particular account is considered "doubtful," for instance, a small blue tag is affixed to the base of the card. The clerk then knows that a careful examination of the ledger sheet is necessary before sanction can be given. These clerks soon acquire an encyclopaedic knowledge of customers' names, and it is rarely necessary for them to consult more than the index when small bills are requiring sanction.

In addition to the main sanction office, a small sub-office has been set up in the food department. This is due to the enormous number of credit accounts which are used, partially or completely, for the purchase of food supplies. The sub-office does not make use of the phone system already described, as all assistants are within a few yards of the section, which is

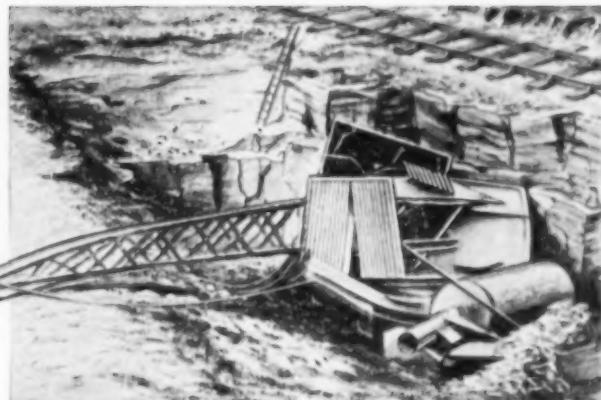
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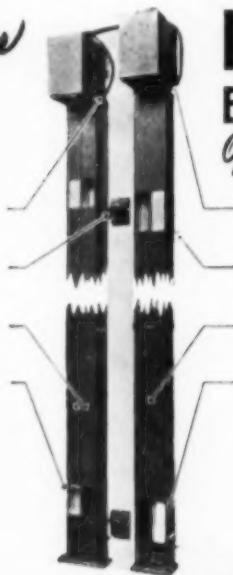
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situated in a small glass office at the main entrance to the department. The system of keeping records is, however, much the same, and the management consider the extra expense fully justified in view of the way that the sub-office relieves the pressure placed on the main sanction office.

Hand in hand with alterations to the sanctioning system have been changes in the methods of dissecting and analysing the daily takings. As in most department stores, these takings are classified under two headings:

1—The takings of each assistant (for calculating commission etc.).

2—The overall takings of each department.

Prior to introducing the new methods of credit sanction, Whiteleys employed what is usually termed the "floor cashier" system—that is, a cash-desk in each department, with a full-time cashier in attendance. From these cash-desks all bills were forwarded to the dissection department, where a large staff was maintained to sort and re-sort them.

To calculate the takings of each assistant, all bills were first sorted under the numbers assigned to assistants, and the total takings of each assistant were recorded. They were

then re-sorted according to the number of the department. It was necessary to re-sort some of them a third time, as quite often two departmental numbers appear on the same bill. This is due to the fact that some assistants serve in two separate departments which, for convenience, are located in the same part of the building. The hardware and kitchen furniture department is one example of this.

Staff Reduction

Under the system now in use, however, a reduction in dissection staff has been achieved, and the cash-desks have been almost completely abolished. To replace them, more than 60 electrically-operated cash registers have been installed in the store. Each of these is fitted with four cash drawers, and corresponding total-keys, so that the daily takings of four assistants can be obtained separately.

Instead of recording sales on the usual ticket-bill, the machines are fitted with a "printing chute." Into this chute the assistant inserts either a printed slip bearing the name and address of the store (for ordinary cash sales) or, in the case of credit customers, the handwritten "entry" bill. The

assistant then presses down the total-key bearing her number—1, 2, 3 or 4, as the case may be—and rings up the amount in question. This causes the machine to overprint the appropriate figure on the slip or entry bill, and to add the amount to the assistant's individual total. It also records full details of the transaction (amount, assistant's number and department number) on an audit roll placed in the body of the register.

The assistant then removes the bill from the chute, hands one copy to the customer and places the other in her "index" envelope, as a visible record of the transaction. On this envelope is pasted a simple chart, with spaces for the assistant to mark the number of the bills. Early next morning, all the audit rolls—with the day's takings for each assistant already "in total"—are removed from the registers and, together with the index envelopes, are sent to the dissection department.

Here, full details of each assistant's takings are entered, and from these same detailed figures, the departmental total is checked. This system has thus eliminated most of the need for sorting—and, as a result, has speeded up the posting of bills to the appropriate accounts.

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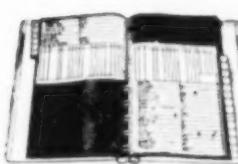
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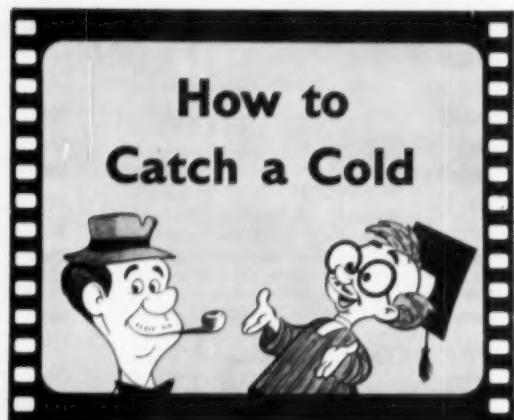
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Guiding principle of the Lorain safety campaign is plainly stated in this works notice

America's 'Safest Plant'

SAFETY is a lot more than absence of accidents. It's a frame of mind, a working philosophy. There's no short cut, no panacea, for achieving safety. The whole secret is diligent attention to details. You have to set up a complete, well-rounded safety programme and then work steadfastly at it.

Here is how the job is done at Lorain Works. The essential ingredient is good housekeeping. Without it, you just don't have a safe place to work. Housekeeping is a three-step job fundamentally.

- 1—There must be a place for everything and everything must be in its place.
- 2—All areas must be cleaned up—and kept clean.
- 3—There must be regular removal of accumulated rubbish, debris and scrap.

There's a lot more to this business of housekeeping than just not having rubbish around for a worker to trip over. A clean, orderly plant makes a positive contribution toward employee morale.

Where strict attention to plant house-keeping is exercised, employees are far more receptive to the entire idea of safety.

There's an elaborate programme set

up to ensure good housekeeping. The plant is divided into zones, each of which is inspected twice monthly by an inspection group comprising two supervisors and the zone foreman. Complete *inspection reports* are submitted to the department heads whose areas have been inspected, to each member of the committee and to the plant's safety department. Within seven days the department head advises the safety department, in writing, of the disposition of any violation of the principles of good housekeeping noted

by the inspection group. An ensuing trip by the inspection committee is made in the same zone to give the members an opportunity to see that all corrections have been made. Elaborate "follow-up" machinery, before-and-after photographs and a lot of other steps are taken to ensure that this inspection programme accomplishes the desired goal.

You are missing the boat if you concentrate on the major accidents only. We operate on the premise that *all* accidents are much the same and

By **GEORGE H. REILLY**

*General Supervisor of Safety,
Lorain Works, U.S. Steel Corporation*

In our August, 1954, issue we published an article (page 83) describing the safety programme of the Newport, Monmouthshire factory of Monsanto Chemicals Ltd., where two million working hours had been clocked up without sustaining a single lost-time accident. We now reprint from the July, 1954, issue of "Management Methods" an account of the safety precautions taken at the Lorain Works of the U.S. Steel Corporation, which has recently won the U.S. National Safety Council's Award of Honour

the only real difference between a "near miss" and a fatality is a matter of degree. In other words, the falling object just *misses* a workman instead of falling six inches closer to him where it might have struck a crippling or a fatal blow, or the flying chip strikes the worker on the cheekbone instead of in the eye. He should have been wearing goggles, of course, but "they were pushed up on his forehead at the time."

The programme at Lorain Works is set up on the conviction that to reduce successfully *all* accidents, reduction first must be accomplished in the minor accidents. Then the more serious accidents will take care of themselves. On that basis, there is a hard and fast policy that *every injury, no matter how slight, must be reported*. Each day's performance is carefully reviewed and every accident investigated. Each day's experience is plotted on a graph and positive steps are taken to correct unsafe acts and conditions which contributed to the accident.

Like every other well-rounded safety programme, there is a lot of attention paid at Lorain Works to the matter of indoctrination and training. Since many new employees are from farms and small towns, they are entirely without industrial background. There is a double-barrelled purpose in the indoctrination effort. One is the obvious purpose of teaching employees such basic things as how to lift properly and other precautions to work safely. Concurrently, we try to acquaint him fully with his company and the importance of what it does. This gets back to the "safety is a frame of mind" idea again, because an employee who is proud of his company is a part of the organization and his state of mind is conducive to safety.

One phase of the training safety programme is to develop in the minds of the new employees—and to keep the



Safety shoes are worn by 88 per cent of employees at the plant

thought uppermost in their minds as they become long-term workers—an awareness of the importance of wearing eye protection and other safety equipment. "Safetygrams," twice weekly safety reminders which are placed on bulletin boards and otherwise distributed throughout the plant, often feature case histories in which a man's sight was saved by safety glasses. Safety shoes and other apparel and devices are exhibited and their uses are explained during the indoctrination. The new employee is then given an opportunity to visit the safety shoe store where he may purchase, on the payroll deduction plan if he so desires, a pair of carefully-fitted safety shoes.

Lorain Works has had excellent results in this shoe programme and a

constant selling job is done to ensure its continued success. At present 88 per cent of the employees wear safety shoes. Cases of workers who "just happened" to have on their safety shoes when mowing the lawn at home and getting their foot caught in the lawn mower are frequently reported. A serious potential accident was averted. Another report was that of a company doctor, a regular wearer of safety shoes, who dropped a 15-pound piece of medical equipment on his foot and escaped injury. The programme has resulted in an appreciable improvement in the number of foot accidents.

A vital phase of the training programme is handled by supervisors who are given periodic training in how to instill safety skills among their workers. When a worker is spotted committing an unsafe act, the supervisor acts immediately to eliminate the probability of a future accident. He sees to it that the man stops the act; explains to the worker *what he did unsafely and why it is unsafe*; he demonstrates the safe way to perform the job and *then is the audience while the worker demonstrates back to him the correct way to do it*. The supervisor checks back frequently to make sure the job is being performed in the prescribed manner.

Our entire programme is based on observation over a period of years that at least 85 per cent of all accidents occur because of unsafe practices. The other 15 per cent are attributable to mechanical failure or to the absence of protective devices. The basis for safety at Lorain Works is that the answer to accident elimination lies in the workers' attitudes and their state of mind. The greatest problem in industrial safety, we believe, is to get men to know and realize that their greatest dangers are within themselves—not outside. Some workers and even some supervisors admittedly are slow to warm up to that viewpoint. This doesn't mean they're necessarily hard-boiled or unco-operative—they simply don't see the light. We believe it's our job and that of every supervisor in the plant to get workers to gain and hold the right viewpoint. That business of changing viewpoints, like eliminating accidents, is a difficult but worthwhile job.

One final word: No safety programme can succeed without the active support of top management. This has to be more than lip service and lukewarm endorsement of safety programmes. We have, at Lorain, the positive and emphatic support of General Superintendent Robert Urquhart.

Continued on page 143

BUSINESS

Some Safety Points

- 1—*Good housekeeping—a clean and orderly plant—is essential to safety. A system of inspections, by a rotating team of supervisors, is used to ensure it.*
- 2—*By concentrating on reducing the minor accidents, it has been found that the more serious ones take care of themselves.*
- 3—*Safety-consciousness is instilled by teaching employees about (a) the work of the company and its importance, (b) the basic working arts, such as how to lift properly, and (c) the value of protective clothing.*
- 4—*"Safetygrams" are placed on bulletin boards twice a week.*
- 5—*The safety report comes first on the daily meeting of supervisory staff.*



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S.B. 65

Well-planned Refrigeration Cuts

Policy Column

Group Control Methods

COMPANIES with factories in various parts of the country favour different methods of controlling their canteens.

Some allow each canteen to operate as an entirely separate organization under the control of the factory manager. Representatives of all other departments meet and compare notes with their opposite numbers, but the canteen lives a lonely life—only disturbed from time to time by rumours that Mrs. White at X factory makes a better food percentage or Mrs. Black at Y factory serves better dinners.

Other companies appoint a travelling canteen adviser. Where the right person (efficient, forceful but tactful) is chosen, much good can come from this system. In two years, for example, one of these advisers has (a) recommended budgets for each of a group of canteens; (b) standardized tea recipes and methods; (c) laid down standard equipment requirements; and (d) organized conferences and courses from which the canteen managers and cooks have derived considerable benefit.

Third method is to appoint a catering supervisor with a suitable establishment of clerks and assistants to operate and manage all canteens. Where possible, bulk-buying is undertaken. Staff can be moved from one canteen to another for training, and canteen managers have the incentive of being able to look for promotion in the larger organizations within the group.

Again, if the right person is chosen, this system can reduce costs, raise the standards of efficiency, and take heavy burdens from the shoulders of personnel departments and factory management. Whether one system is better than the other depends on the degree of centralization of the factories concerned.

Scarcely less important than picking the right person is laying down clear and precise terms of reference. Other essentials are adequate support in upholding these executives' authority, and a staff large enough to ensure that each establishment can be visited at least once a month.

Canteen Food Costs

By WINIFRED McCULLOUGH

Senior Canteens Adviser, Industrial Welfare Society

General-purpose refrigerators, deep-freezes, cold rooms, refrigerated counter displays—all have an important part to play in the works canteen. This article describes the functions and capabilities of the main types

REFRIGERATION halts the decomposition of food by inhibiting the growth of bacteria, and is an alternative to sterilization, dehydration and the use of preservatives. Today, even vegetables are stored at mechanically lowered temperatures. A well-planned refrigeration system plays an important part in avoiding food waste—and thus reducing operating costs—in industrial canteens.

All canteens need some form of refrigeration. In the smallest establishments, simple "domestic" models may suffice; but large canteens require more elaborate equipment—deep-freeze lockers, cold rooms, controlled temperature larders and pantries, and ice-cream cabinets.

The usual allowance of refrigerator space in industrial canteens is half a cubic foot for each main meal served. In the United States (or, at least, in some parts of the U.S.A.) the stipulated amount is one cubic foot for each seat in the dining room.

Much depends, obviously, on individual circumstances. A canteen in a big town, where meat, fish, milk, etc. are delivered daily, may manage satisfactorily with less than the half a cubic foot allowance; a canteen in an isolated district may well require more.

A point worth bearing in mind is that refrigerators of 13 cubic feet

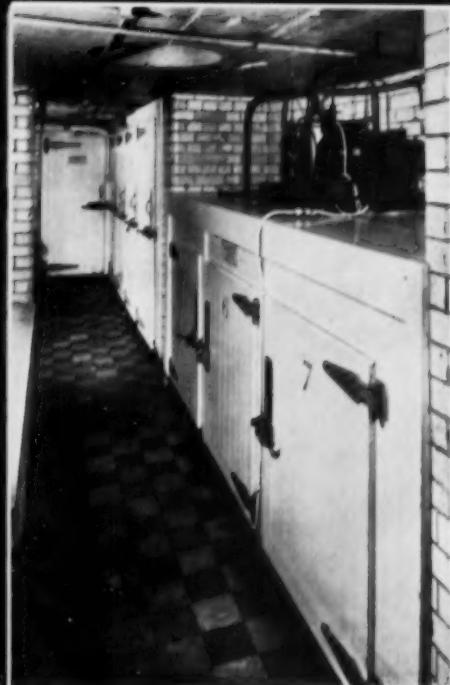
capacity or more carry no purchase tax (although naturally they cost more to run and take up more space).

Meat, fish, milk, cream and butter should always be refrigerated, of course. In some models, cheese, eggs and salads can be accommodated in special containers. All "left-overs" must be refrigerated, but should never be put into the refrigerator until they are cool. Strong-smelling foods, like fish, curry and cheese, should be covered, otherwise they will taint other foods.

Defrosting

The refrigerator should never be used as just another store-cupboard. Its contents should be checked regularly to see that they are in good condition and are used in strict rotation. Every part of the appliance should be kept scrupulously clean, and thorough defrosting should take place at least once a week (except in ultra-modern models with automatic defrosting equipment). Regular maintenance visits are well worth paying for, as in the case of all costly, complicated and delicate mechanisms.

In the small establishment, the refrigerator is often situated inside the larder—partly for coolness and partly for security reasons. In larger establishments there is often a small refrig-



Picture by Courtesy of J. & E. Hall Ltd.

Coldrooms are built by the refrigerator manufacturers to the customers' specifications

erator for the cooks' use near the main food preparation area, as well as larger ones in or next to the stores.

It is important that the refrigerator doors should open on to as cool an area as possible, thus avoiding sharp temperature changes on opening. To minimize the load on refrigerating machinery, the units should be placed against a north or east wall. Even the best models make a certain amount of noise, so the machines should not be located too near the offices or the directors' dining-rooms.

The normal temperature at which to set an all-purpose installation is 35 deg. F. If the refrigerator is in a cool pantry and its doors are seldom opened, 40 deg. F. is satisfactory. Lower temperatures would not inhibit the growth of bacteria.

In *Cooking Appliances, Schedule of Types*, published a few years ago by the Stationery Office, the duties of a refrigerator are stated briefly as "to maintain an inside temperature of 35 deg. F. when the outside temperature is 80 deg. F. and the running time of the compressor does not exceed 20 hours in a 24-hour day and (to be) capable of lowering the temperature of the cold room from 65 deg. F. to 35 deg. F. within 24 hours when stocked



A deep-freeze cabinet — like this Frigidaire — is useful in large canteens

with food at 3lb. per cubic foot. . . ."

A refrigerator that can stand up to these requirements (and all good modern machines can) will not be dismayed by anything our climate produces and will function satisfactorily under all conditions, unless loaded with food at a temperature higher than normal room temperature. It is a useful piece of supervision to open the refrigerator from time to time and glance at its thermometer; this should never show a higher reading than 50 deg. F.

Which types are most suitable for canteen use? It would be possible to discourse learnedly about continuous absorption refrigerators versus the



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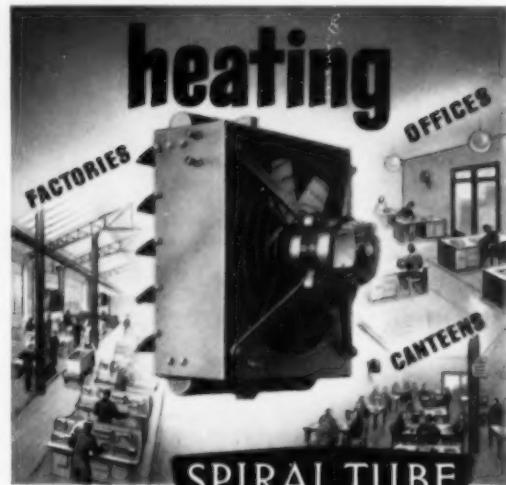
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compressor type, or contentiously about electric refrigerators versus gas refrigerators. But I have used practically every known type of refrigerator during the last fifteen years, and have found that all types in general use are both effective and reliable.

When a choice is made, however, it is necessary to consider carefully the shape and size required, the price quoted, the guarantee offered, whether ice-making apparatus is required or not, and the quality of construction, finish and motor. The works engineer is in an excellent position to choose between one type and another, once the caterers' requirements are clearly understood.

Here is a brief guide to the principal types of refrigeration equipment in which a canteen is likely to be interested.

GENERAL PURPOSE

Illustrated on this page is one of the many excellent models available in this category. The machine has a net capacity of 16.7 cubic feet, including a 1.7 cubic foot frozen food locker. An ice-cube compartment is provided. Shelves are removable and the smooth enamel finish, inside and out, is easily kept clean. The compressor, electric motor and all moving parts of the

power unit are hermetically sealed in a welded steel case.

COLD ROOMS

These are built by refrigerator manufacturers to the customers' specifications; most of the larger manufacturers have planning engineers who advise on such installations. It is generally found desirable to have sectional cold rooms at varying temperatures for different foods. They can be adapted to any reasonable shape.

DEEP-FREEZE

Many canteens are installing cabinets with a temperature of 0 deg. F. to 5 deg. F. for the storage of ice-cream and frozen foods. A good example of this type is illustrated on page 124. Vending machines are also available for ice-cream and are being installed in some canteens.

REFRIGERATED DISPLAY

The refrigerated display of cold sweets, salads and cold snacks is fairly common in restaurants but, as yet, rare in the canteen. But for economy, safety from food poisoning, and appetizing display this type of installation has obvious advantages.

CHILLED DRINKS

Automatic coin-operated refrigerators for the sale of soft drinks are now



This Prestcold general-purpose refrigerator has a shelf-area of 26.2 sq. ft.

available. The value of these in industries where workers are in the habit of taking iced drinks is obvious. Offices, too, find them a good investment.

PASTRY PREPARATION

The use of dough-retarding refrigerated cabinets enables a baker to prepare yeast goods overnight for firing first thing in the morning, thus eliminating night work. One large canteen has trebled its bun and rolls sales after installing a retarding unit.

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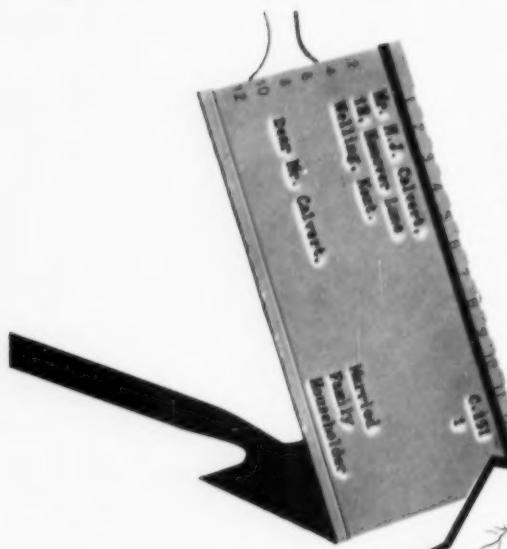
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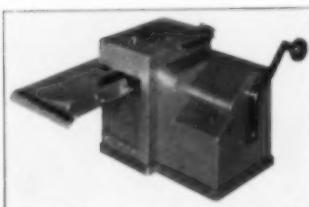
● Office . . 129 ● Industrial . . 137 ● Welfare . . 142 ● Canteen . . 142

FOR YOUR OFFICE

Desk Book-keeping Machine

THE new 58 EN desk-model book-keeping machine is fitted with a keyboard which reduces listing operations to a minimum. Two or more figures can be set up at one time and checked before printing, while ciphers print automatically. A "proof tape," containing a list of previous balances and amounts posted, provides positive proof of the accuracy of each posting. As soon as each posting is completed, any errors can be easily detected.

In order that fully-itemized statements are always ready for mailing, up-to-date balances can be computed and printed as accounts are posted. The date is printed with reference



Quick, safe signatures

A new machine, the *Director*, handles up to 80 cheques a minute, and is safeguarded against unauthorized use by two independent locks.

One or two signatures are printed either simultaneously or separately, their positions being set automatically; alternatively, joint signatures can be printed. A visible counter is fitted and is re-set, when required, by a special key; the accuracy of the counter is ensured by an automatic trip.

The *Director* is available for either electrical or hand operation. With hand operation, speeds of up to 2,000 cheques an hour are obtained.

Enquiry Ref. No. O.1/2.



Fewer listing operations

numbers or amounts, and an automatic credit balance prints the actual credit balance from the total bar.

Other features of the machine are: the key stops, which simplify posting by automatically controlling the functions of the machine; the "B" total, which accumulates the amounts posted; and the "answer" dials, which permit the operator to check the accuracy of each posting before clearing the machine.

Total capacity is £99,999 19s. 11½d.
Enquiry Ref. No. O.1/1.

80 Cheques a Minute

MECHANICAL cheque-signing is sanctioned by the leading banks and has obvious advantages—especially when one considers the executive level at which time and energy are saved!

Recessed Table

DESIGNED especially for calculating-machine operators, a neat office table incorporates a recessed section which holds the machine at



For machine operators

the right height for efficient working. For safety, the right-hand side of the recess has an unobtrusive guard.

The top of the table, including the recessed section, is covered with high-grade linoleum, and all outside edges are faced with a durable plastic binding. The drawer has a plastic pull, which matches the binding, and can be locked. Where an electrically-driven machine is used, the lead can be passed through the table to the nearest power-point.

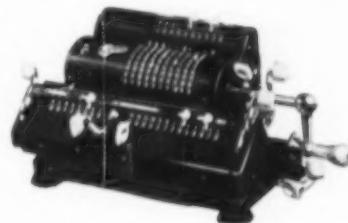
Overall dimensions of the table are: Height 29in., width 48in., depth 30in.

Enquiry Ref. No. O.1/3.

One-hand Operation

OPERATION of the *Schubert L-KV* calculating machine is simplified by the fact that all controls are within easy reach of the crank; the machine can be operated, if desired, with one hand. Its capacity is 10 x 8 x 13.

The carriage is mounted on rollers and its displacement is controlled from



Controls are grouped

either of two positions: at the front of the machine and on the right-hand side. Each control device incorporates two levers which, in conjunction with the design of the track, eliminates the use of springs.

A visible setting register above the keyboard helps to eliminate eyestrain and avoid errors. Contributing to the speed with which the machine calculates are a tens-transmission system and a counter control key for accumulative or negative multiplication and division. Result and proof registers may be cleared either simultaneously

★ Equipment included in this survey is selected for its news value alone. The names and addresses of the manufacturers or distributors of items mentioned can be obtained by writing to the Editor, quoting the appropriate reference number. Manufacturers are invited to submit details of new and interesting products for consideration. An original photograph should accompany each item submitted.

Business EQUIPMENT SURVEY

or individually. A back transfer key for progressive calculations is provided.

In operation, the machine is almost noiseless. Vibration of the metal covers is reduced to a minimum by a special fibre coating. All parts are machined; castings are not employed. The finish is dark green, and the figures are large and legible.

Alternative models of basically the same specification are the *DV* (without the back transfer lever) and the *DW* (without the back transfer lever, the optional one-hand operation feature and the counter control key).

Schubert calculating machines have been made in Germany for many years, and are now being distributed in Britain.

Enquiry Ref. No. O.1/4.

Automatic Mailing

A UNIQUE feature of the Swiss-made *Kern* letter-folding and envelope-filling machine is the entirely mechanical method of insertion; no pneumatic devices are used. The folded documents (plus any additional material fed into the machine via a slot) are held in a metal pocket, which slides into the envelope and withdraws, ready for the next batch, when the contents are inserted fully.

The accuracy with which the material is positioned is particularly valuable, of course, where window envelopes are used.

Two models are available: the semi-automatic *KAT*, into which the documents are fed by hand, and the fully automatic *KAU*.

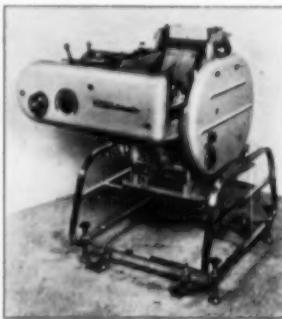
The *KAT* will make two horizontal folds, and up to six or eight sheets (depending on their thickness) may be inserted together. The additional insertions slot is used for miscellaneous

material which does not require folding. Speeds of up to 2,500 insertions an hour are obtained.

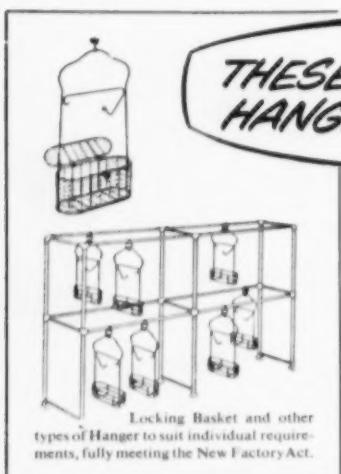
In the *KAU*, the documents are fed automatically from a stack. The feed mechanism incorporates its own folding system, producing a vertical fold; this can be switched on or off independently of the main folding system. An electrical trip device eliminates any possibility of double insertions, and the machine operates at speeds of up to 3,000 insertions an hour. If desired, the additional insertions slot can be used to supplement the automatic feed.

In both machines, the envelopes are placed in the holder exactly as they are removed from their cartons. A feed mechanism takes the bottom envelope from the pile and automatically opens its flap ready to receive the contents of the metal pocket. Envelopes can be added to the pile while the machine is operating. The moistening and sealing mechanism needs no attention, apart from refilling its water container.

Kern machines are supplied to the customer's specification; indeed, the manufacturers are prepared to consider unusual specifications, involving even the insertion of heavy booklets. After installation, the width (but not the



All-mechanical insertion



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Business EQUIPMENT SURVEY

depth) of the envelopes can be varied over a wide range; paper sizes and folds are easily adjusted.

The construction and finish of the machines are impressive. All rotating parts are mounted on ball-bearings, protected by dust-proof caps. Fibre gears reduce noise and help to ensure long life with very little servicing.

Enquiry Ref. No. O.1/5.

Versatile Recorder

THE recently-introduced *Diplomat* dictating machine records magnetically on paper discs. These can be filed, or folded and sent by post in



"Mike" becomes loudspeaker

ordinary envelopes. Erasures and alterations can be made immediately, and the discs themselves can be used time and time again.

Apart from handling normal office dictation, the versatile *Diplomat* undertakes other important tasks. It will record both sides of a telephone conversation without using a microphone, and will also amplify the conversation so that it can be heard by everyone in the room. It provides an intercommunication system between the executive and his secretary. By means of a switch, the microphone can be converted into a miniature loudspeaker.

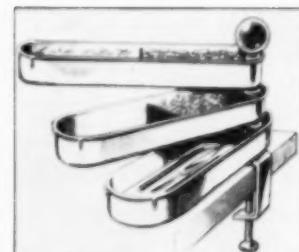
All controls are grouped conveniently on the front panel and the machine itself is compact.

Enquiry Ref. No. O.1/6.

Fingertip Storage

CLAMPED to an office desk, the *Multipart* provides a neat, time-and-tempo-saving method of storing pins, clips, rubber bands and other small items. It consists of three trays pivoted on an upright and able to swivel through 360 deg.

The trays are moulded in either coloured or transparent plastic material. Two of them are sub-divided by small removable partitions.



Neat nest for small items

Easily dismantled for cleaning, the unit is attached to the desk by a strong screw clamp, lined to prevent damage to polished surfaces.

Enquiry Ref. No. O.1/7.

Reaching the Top

NOW on the market is a simple but quite ingenious device which helps office workers to reach the top shelves of steel shelving units—and thus saves the time which is usually spent in fetching chairs or steps.

Known as the *Handi-Step*, it consists of two units: a step and a handle. These are bolted securely to an upright.

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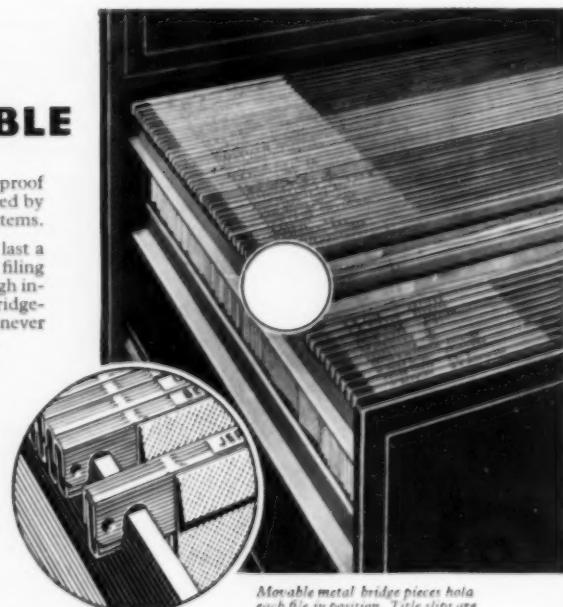
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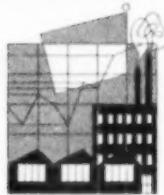
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In case you want details of other applications, may we invite you to send for some interesting Basic Plans covering in generalised form such applications, as Ledger Posting, with columnar or unit-card analysis if required; Stores Accounts; Payroll and P.A.Y.E.; Cheque and Receipt Writing; Trader's credit plan for payments, etc.

Business EQUIPMENT SURVEY

If *Handi-Steps* are attached to alternate uprights, all shelves in the installation are brought within reach.

Both units are made of steel; the step is finished in olive green enamel, and the handle is chromium-plated. Bolts and nuts are supplied.

Enquiry Ref. No. O.1/8.

Vehicle Control

MAKERS of the *Shannovue* visible record card system have devised a series of vehicle control records, suitable for transport fleets varying in size from six to hundreds of vehicles.

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Enquiry Ref. No. O.1/9.

Telephone Table

THE *Teletable* is specially designed to help executives keep their desks clear of telephone and intercom equip-



Keeps the desk clear

ment. The top of the cabinet houses the telephones, while two additional shelves provide plenty of space for reference books and trays.

Dimensions are: height, 2ft. 6in., depth, 1ft., length, 2ft. 6in.

Enquiry Ref. No. O.1/10.

Quick-Action Glue Pen

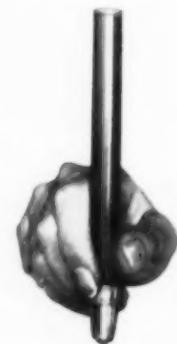
CONSTRUCTED in pen form, the new *Fastik Glue Pen* provides a rapid and efficient method of sticking

pages together. Each time the pen point is pressed against the paper a spot of glue is automatically released, and this acts as soon as it is pressed between the two surfaces to be joined. The glue will not, however, adhere to the fingers, and may be rubbed off any surface to which it has been applied should this be found necessary.

Refills for the pen can be obtained, each of which contains about 5,000 spots of glue.

Enquiry Ref. No. O.1/11

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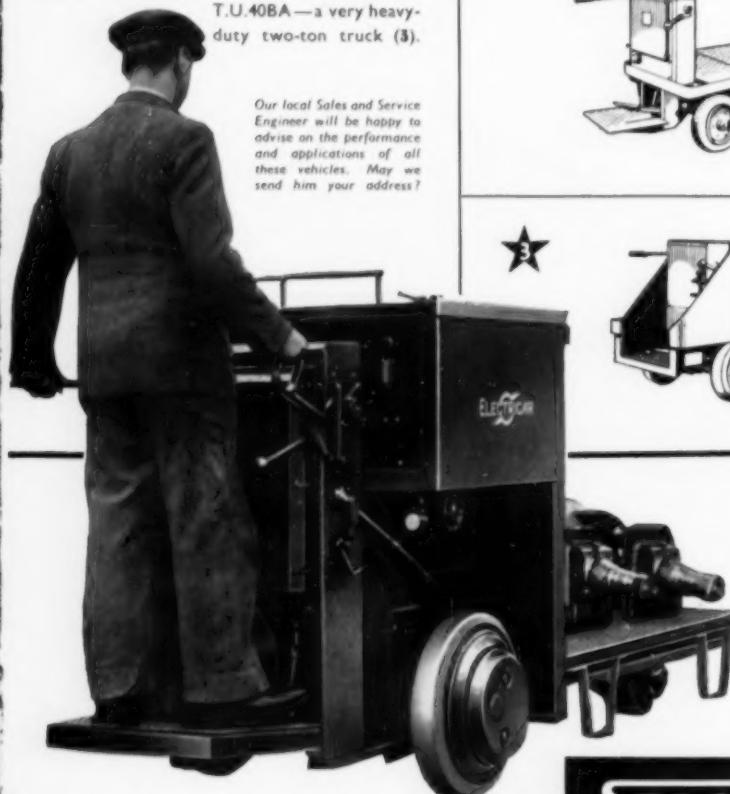
NAME _____

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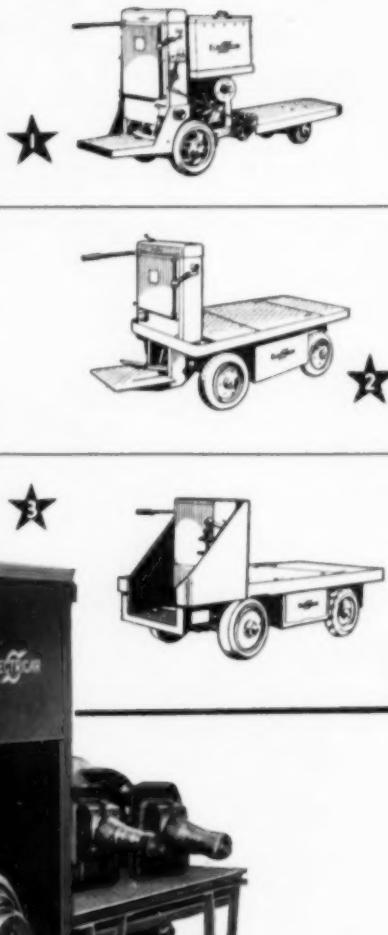
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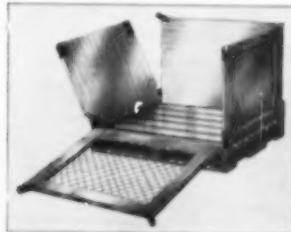
INDUSTRIAL EQUIPMENT

PACKAGING

Saves Weight and Cost

USE of wood has been made possible in the new *Wade* collapsible box pallets by the design of a simple form of pivot hinge for the sides. It is claimed that the use of wood saves both weight and cost, and the type of box pallet illustrated can be supplied either with solid sides or wire mesh sides according to the nature of the material to be contained.

The wooden-framed sides of the pallet are detachable, and being of



Wooden sides are detachable

wood are easily repaired or cheaply replaced in the event of damage. It is claimed that the pallet is perfectly rigid when erected, to permit stacking.

Enquiry Ref. No. F.1/1.

INSPECTION

Electronic Fault-finder

DESIGNED for checking the operation of running machinery, a new type of industrial stethoscope, the *Auditec* electronic fault-finder, is claimed to be the first British industrial stethoscope employing electronic amplification, and its range of sensitivity is said to be considerably greater than that of existing acoustic instruments.

The fault-finder consists of a sturdy wooden casing housing a three-stage stabilized-circuit amplifier, freely suspended to reduce shock and vibration, and a combined high-tension and low-tension battery with a life of about 300 hours. When in use the casing may be slung over the shoulder, and it is provided with sockets for plugging in a pair of lightweight headphones and a detector probe. The latter has an insulating plastic handle enclosing and protecting the microphone from damage and moisture, and it can be used safely when in contact with high-tension voltage. The metal probe itself

can be removed by unscrewing, and can be replaced by a longer special-purpose probe.

The instrument is provided with a volume control adjustable over a wide range, and a two-position frequency control, which covers a wide frequency range. Among its applications are fault detection and quality control for all moving machinery, engines, transmissions, bearings, pipelines, fans and heating systems. As an example of its versatility, it can be used for checking watch movements or for large refrigeration plants.

Enquiry Ref. No. F.1/2.

ELECTRICAL SUPPLY

Compact Connectors

A RANGE of multi-way connecting plugs and sockets are being manufactured as a result of the growing interest in unit construction in the electronic and light engineering fields. They are small and lightweight, and are available in 20-, 30-, 40-, 60- and 80-way sizes. The plugs and sockets of the connectors are compact, each being contained within a rectangular aluminium case. The units may be packed closely together on a chassis or panel.

The plug and socket contacts are silver-plated and designed to provide a positive connection only when fully engaged. Contacts are recessed within their respective housings as a protection against mishandling.

The incoming cable is firmly clamped to the plug body so that there is no strain on the soldered connections, and the aluminium case of the plug may be removed without disturbing the connections. To facilitate soldering in the confined space, the near ends of the contacts have been staggered and the hollow plug pins have been machined to allow the ingress of solder.

It is possible to build up com-



Available in five sizes

prehensive plug and socket systems with the following combinations—(1) Two 20-way plugs with one 40-way socket, (2) two 30-way plugs with one 60-way socket, and (3) four 20-way or two 40-way plugs with one 80-way socket.

Enquiry Ref. No. F.1/3.

Quick Response

THE *Servomex* 2.5amp. DC voltage stabilizer, type no. 38, is claimed to be the first purely electronic voltage stabilizer of such high current rating, commercially available as a standard production instrument. It is suitable for scientific and engineering work in a wide range of fields calling for a stable low-voltage source. The voltage range is 1-15 volts DC and the current, 0-2.5amp. continuous rating. The voltage drop when the load current is switched on corresponds to an



Electronic voltage stabilizer

output resistance of 2 milli-ohms. A change in mains voltage of plus or minus 10 per cent causes a change of output not exceeding plus or minus 5 millivolts. Ripple is not more than 3 millivolts RMS under the worst conditions. Two meters are fitted. The ammeter reads 0-3amp. and the voltmeter has ranges of 0-3 and 0-15 volt.

Enquiry Ref. No. F.1/4.

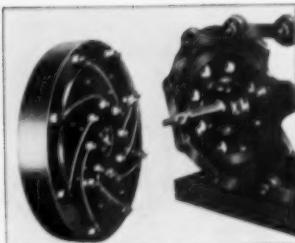
MAINTENANCE

Chain Lubricator

A NEW automatic chain lubricator is designed for use with all types of chain conveyors and can be engaged or disengaged, assembled or dismantled as a complete unit, while the conveyor is running.

The lubricator is arranged to work in conjunction with the chain sprocket wheels and is quite independent of chain speed. All mechanism of the unit is totally enclosed in an oil-tight aluminium case which forms an oil bath providing splash lubrication for the mechanism itself. It is claimed

Business EQUIPMENT SURVEY



For all chain conveyers

that the lubricator is simple and safe to operate and can be used by unskilled labour.

Various sizes are available depending on the number of teeth in the sprocket wheel and the pitch of the chain. However, with two lubricators fitted at the tail end of a conveyer the increase in overall width of the conveyer is normally never more than 18in. When necessary, they can be fitted at the driving head end of a conveyer.

The unit is designed for working under very bad conditions, such as dust or steam-laden atmospheres. When these conditions are extremely bad, a simple air jet cleaning equip-

ment is provided which automatically cleans each nipple before and after lubrication.

Enquiry Ref. No. F.1/5.

PORTABLE POWER TOOLS

Sheet Metal Cutters

INCLUDED in a new range of *Trumpf* hand tools are portable shearing and nibbling machines and a rip saw. It is claimed that all kinds of shapes can be cut, including small-radius curves in either direction and straight-through cuts. Material of any size can be worked.

Each model weighs only a few pounds and is motorized with either a universal or AC supply motor, with

a flexible lead. In most cases the fan-cooled motor is enclosed within the gripping portion of the machine body.

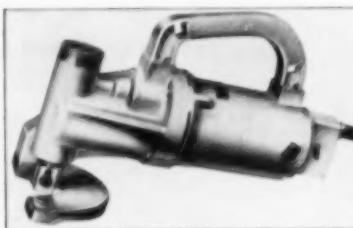
The range comprises shears with capacities from .065in. to .18in. in sheet iron, including models with c-shaped blade carriers for trimming heavily shaped sheet parts and piping, and with cutting direction in line with or at right angles to the motor shaft axis. Pneumatic hand shears, for connection to the shop airline, cut sheet iron up to .1in. thick, with the same cutting directions. Nibbling machines and rip saws have capacities up to .08in. thick.

Enquiry Ref. No. F.1/6.

HEATING

For Moist Atmospheres

A NON-METALLIC electric panel heater is said to be capable of providing an even heat over the whole



A new range of portable sheet metal cutters includes models for trimming heavily shaped sheet parts and piping



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Illustrated are impressions of characters and figures of special numbering machines. They meet the many diverse problems of coding, classification and identification and are widely used in the Ball Bearing Industry and for the overprinting of labels, shirt and collar size marking, Jacquard card sequences, the printing of optical formulae, and for multi-impressions through carbon backed forms.

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AND FULLY AUTOMATIC

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No "Blind Spots"

THE new *Chevron* slotted angle bar is claimed to eliminate the necessity for accurate cutting at predetermined points to ensure correct matching of slots for bolting. This new system is based on a geometrical arrangement of



"Home-built" from slotted bar

slots which ensure that a bolting position is always available, there being no "blind spots." It is possible with a well-located right-angle joint to use as many as five bolts to ensure rigidity.

The task of assembling, holding two or more bars and bolting them together is facilitated by the use of a special bolt (supplied with the bars) which has a small projection under the head that prevents it from turning when tightening.

The adjustability of the bars makes it possible to construct accurately on an uneven base. The apex of the slot enables oversized bolts (2in.) or spindles to be inserted at every inch. This feature is useful in the erection of gravity conveyers, or other assemblies where components must be located accurately and positively, with or without bolting.

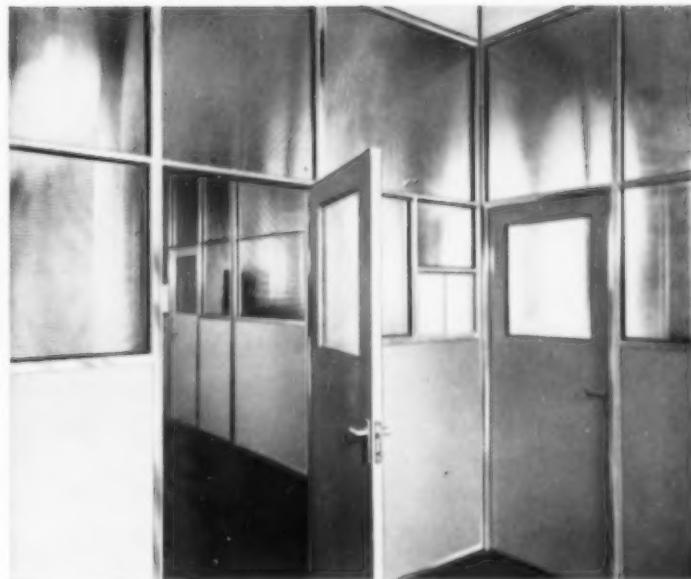
The bars are calibrated in feet and the distance between corresponding points of the slots is one inch. The bar is made in two sizes, 2in. by 2in. and 3in. by 2in. for medium and heavy duty. Standard shelves are available in various sizes with a slot in each corner, enabling them to be bolted to vertical bars at any height desired.

Enquiry Ref. No. F.1/11.

Versatile Washer

A NEW multi-purpose washing unit, the *Paraminor*, incorporates a hand-operated pump capable of delivering 300 gal. per hour at 20lb. p.s.i. Measuring 15in. by 19in. by 23in. high, it is designed for use with a cold cleanser, paraffin or white spirit, but can also be used for oiling new parts or coating them with rust-preventative. The sump has a capacity of two gallons.

Enquiry Ref. No. F.1/12.



Type 'F' Partition in the offices of The Printing Trade Alliance, London, E.C.4

Announcing a new system of partitioning

Developed in the light of wide experience gained in the fabrication of all classes of partitioning and internal cladding, the Anderson Type 'F' system of construction offers the following advantages:

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- LIGHT WEIGHT
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● Type 'F' Partition is the latest addition to the Anderson range. The framing, formed of extruded aluminium sections, embodies special features including rubber glazing beads and rubber inserts in architraves to eliminate noise and vibration. Choice of paneling may be made from a variety of attractive sheet materials. Enquiries are invited. Please ask for literature.

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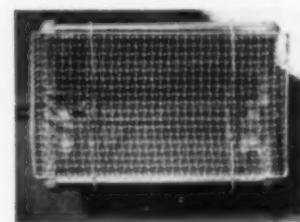
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7 York Place, Adelphi, London, W.C.2.
Tel.: TRAfalgar 3718.

Business EQUIPMENT SURVEY

WELFARE EQUIPMENT

Fire Guard

ALTHOUGH the Fireguards Act of 1952 expressly forbids the manufacture of electric fires unless fitted with safety-guards, there are still in use many thousands of older-type office fires and heaters which constitute a menace to those working near



Adaptable to most heaters

them. The Lumley fire guard is designed to eliminate the risk of burns by ensuring that clothes cannot come into contact with the heating element. Constructed of light but strong woven wire, the guard can be clipped to any type of wall, box or reflector electric fire.

Enquiry Ref. No. W.1/1

CANTEEN EQUIPMENT

Food Mixer and Blender

AN interesting feature of the *Paladin Senior* food mixer and blender is a "feeder lid," which enables the operator to pour liquid or powder ingredients into the moving cutters without having to remove the lid itself. In addition, the machine has a total of four speeds, and is fitted with heat-resisting glass in



"Feeding" is easy

BUSINESS

both goblets and mixing bowls, thereby ensuring easy cleaning and simple control.

Finished in bright chrome, the mixer will work on either A.C. or D.C. 110/130 volts or 200/240 volts.

Enquiry Ref. No. C.I/1.

Tray Mat

A USEFUL accessory for many cans is the *Bex* table mat. The mat is vacuum-formed in p.v.c. and has a realistic natural linen and embroidery finish. It has the further advantage that it will not stretch or



Will not stretch or mark

mark, and can be easily cleaned with warm soapy water. With normal usage, the manufacturers claim that it will last for many years.

The mat can be obtained in pastel blue, green or off-white.

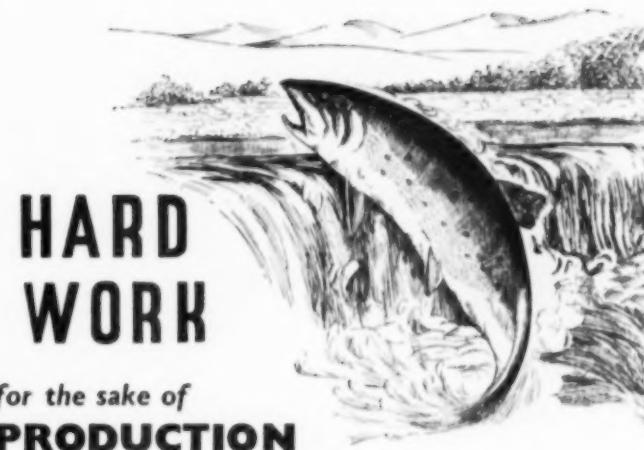
Enquiry Ref. No. C.I/2

AMERICA'S 'SAFEST' PLANT*

Continued from page 120

hart. An indication of how important Mr. Urquhart regards the matter can be found in the fact that he himself takes turns on the roving safety inspection teams.

Also indicative of his interest, Mr. Urquhart holds a daily luncheon meeting for the top 35 members of his top supervisory staff. The "kick-off" report every day is the safety report in which I give a thumbnail picture of good or bad developments during the past 24 hours. You can be sure that there's some very direct discussion involving the department head most closely concerned when this report includes an accident of any consequence. Mr. Urquhart's philosophy is clearly expressed in one of the many large posters appearing throughout the plant. The poster states, very directly and without equivocation: "We request that all employees of this department consider safety ahead of production at all times."



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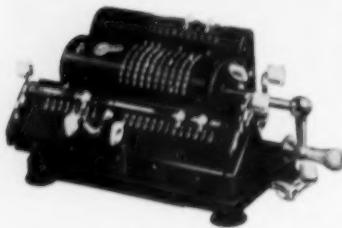


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CONSULTANT AND THE SMALLER FIRM—Continued from page 102

variations. The impact of volume on overheads is taken into account, together with any revisions to the forward plan. From the actual profit on manufacture are deducted administration, selling and packing and distribution expenses to arrive at the net profit. The total profit is further analysed by product.

A statement of assets and liabilities shows the position of the company at the end of each accounting period. Another return shows how stocks are moving.

In addition every department, whether production, service or administration, receives monthly statements on suitable forms. These analyse forecasted and actual expenditure of every item of expense—for example, direct labour, supervision, indirect labour, consumable supplies and materials. Variations from the standard are set out and analysed by source and reason.

The consultants went one stage further by putting in a means of watching very closely the liquid resources of the company (capital and cash forecasting) to ensure that a minimum liquidity would always be

available and to throw up the amount available at any time for capital projects.

It will be evident from this brief review of the main features of the accounting procedure that the system provides management with an efficient and flexible instrument for up-to-the minute control over all departments.

The firm have already benefited substantially from the recommendations of the consultants. Since March 1952, the total output has increased by 32 per cent. Wage rates and average earnings have gone up, but due to the reduction of overtime the actual hours worked are fewer. Workers are therefore getting more money for less time, while the firm have gained by a reduction of about 22 per cent in unit labour cost. Overall, the output per man hour has risen by 51 per cent.

Reduced production costs have allowed selling prices to be brought down, thus enabling the firm to sell easily the increased volume produced. This has helped to overcome the seasonal slackness normal to the industry and so keep workers fully employed throughout the year.

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